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SIXTH EDITION 1997

# OPEN DEconnect

*Structured Wiring System*



**Applications Guide**





# **OPEN DECconnect Applications Guide**

**May 1997**

**This guide describes product information to help plan, configure, and install networking systems based on Digital Equipment Corporation's OPEN DECconnect System and active networking products.**

**This book is intended for use by executives, information systems (IS), telecommunications, and data communications professionals who make decisions regarding networking connectivity. This includes architects, installation consultants, contractors, and facilities engineers involved with building design, planning, installation, and testing.**

**This guide also supports the channels sales, sales support, purchasing, and technical support personnel, in the design and installation of local area networks.**

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# Table of Contents

<b>Introduction . . . . .</b>	<b>1-1</b>
<b>Structure of This Guide . . . . .</b>	<b>1-6</b>
<b>OPEN DECconnect System Overview . . . . .</b>	<b>2-1</b>
<b>OPEN DECconnect System . . . . .</b>	<b>2-2</b>
OPEN DECconnect Architecture . . . . .	2-2
TIA/EIA-568A Commercial Building Wiring Architecture Standard . . . . .	2-3
DIGITAL's Adherence to Standards . . . . .	2-4
Increased Data Transmission Support . . . . .	2-4
OPEN DECconnect System Topology. . . . .	2-4
OPEN DECconnect Super-5 System (TIA/EIA Category 5). . . . .	2-5
OPEN DECconnect Screened High-Performance Interconnect Components . . . . .	2-5
Categorizing Networking Components: Considerations for Implementing Category 5 . . . . .	2-5
OPEN DECconnect: Vendor- and Product-Independent Wiring. . . . .	2-6
OPEN DECconnect Summary. . . . .	2-7
OPEN DECconnect Warranty . . . . .	2-7
<b>Media and Network Planning . . . . .</b>	<b>2-8</b>
Structured Cabling Systems: Planning for the Future . . . . .	2-8
LAN Cable Media Applications and Selection Considerations . . . . .	2-9
Cabling Choices . . . . .	2-9
Twisted-Pair Connector Pin Assignments TIA/EIA-T568A . . . . .	2-11
Fiber-Optic LAN Backbones . . . . .	2-12
Structured Networking . . . . .	2-13
Zone Distribution Model . . . . .	2-14
Zone Distribution MultiStack Rack Pack. . . . .	2-15
Distributed Backbone Model. . . . .	2-17
Work Group Model. . . . .	2-18
Collapsed Backbone Model . . . . .	2-19
Interconnect Implementation . . . . .	2-20
Full Cross-Connect Implementation . . . . .	2-21
OPEN DECconnect Components Support EIA/TIA Standards . . . . .	2-22
<b>OPEN DECconnect System Components. . . . .</b>	<b>3-1</b>
<b>OPEN DECconnect Hinged Patch Panels. . . . .</b>	<b>3-2</b>
<b>OPEN DECconnect Category 5 Metal Patch Panels . . . . .</b>	<b>3-4</b>



<b>OPEN DECconnect Modular Faceplates, Wallboxes, and Connectors . . . . .</b>	<b>3-6</b>
<b>European Faceplates . . . . .</b>	<b>3-8</b>
<b>UTP Patch Cables/Office Cables . . . . .</b>	<b>3-11</b>
<b>UTP Equipment/Device-Specific Cables . . . . .</b>	<b>3-13</b>
<b>UTP Building Wire . . . . .</b>	<b>3-16</b>
<b>110 IDC Terminal Blocks . . . . .</b>	<b>3-17</b>
<b>UTP and ScTP Modular Plugs . . . . .</b>	<b>3-19</b>
<b>OPEN DECconnect Screened Twisted-Pair (ScTP) System Components . . . . .</b>	<b>3-20</b>
Patch Panel and Faceplate Inserts . . . . .	3-20
Cable Assemblies . . . . .	3-20
Building Cable . . . . .	3-20
<b>OPEN DECconnect Patch Panels and Faceplate Inserts for Fiber-Optic Systems . . . . .</b>	<b>3-22</b>
Patch Panel Modules . . . . .	3-22
Faceplate Modules . . . . .	3-22
<b>Fiber-Optic Patch Cables, Office Cables, and Equipment Cables .</b>	<b>3-23</b>
<b>Fiber-Optic Cables for Building Wiring . . . . .</b>	<b>3-25</b>
<b>Connectors and Splices for Fiber . . . . .</b>	<b>3-26</b>
Connectors . . . . .	3-26
Pigtails . . . . .	3-26
Splices and Splice Organizer . . . . .	3-26
<b>Fiber Distribution Units . . . . .</b>	<b>3-28</b>
High-Density Fiber Distribution Units . . . . .	3-28
Fiber-Optic Coupler Panels H3114-GA/GB/GC/GD/GE/GF/GG. . .	3-28
Low-Density Fiber Distribution Unit . . . . .	3-28
Remote Wallmounted Enclosure for Fiber-Optic Cable (H3131-CA) . . . . .	3-29
<b>OPEN DECconnect Faceplates and Patch Panel Inserts for Coaxial Cable . . . . .</b>	<b>3-31</b>
<b>Coaxial Cables (Office/Equipment/Building) . . . . .</b>	<b>3-32</b>
<b>Miscellaneous Connectors for Coaxial Cable . . . . .</b>	<b>3-33</b>
<b>Mechanical Assemblies . . . . .</b>	<b>3-34</b>



<b>Modular Mounting System Accessories . . . . .</b>	<b>3-35</b>
Modular Mounting System with Cover (DERMS-FA) . . . . .	3-35
Single Modular Mounting System Extender Kit (DERMS-BA) . . . . .	3-35
Double-Height Cover for Hub (DERMS-DA) . . . . .	3-35
Single Cover for Hub (DEHUX-FA) . . . . .	3-35
<b>Modular Mounting Optional Components . . . . .</b>	<b>3-36</b>
RETMA Rack Mounting Bracket (H3108-RA) . . . . .	3-36
Angled RETMA Mounting Bracket (H3108-RB) . . . . .	3-36
<b>Modular Mounting System Accessories . . . . .</b>	<b>3-38</b>
Work Surface Tray (H3108-TA, Sliding) (H3108-TB, Hanging) . . . . .	3-38
Cable Organizer Kit — Recess-Mounted (H3108-AA) . . . . .	3-38
Cable Organizer Kit — Flush-Mounted (H3108-EA) . . . . .	3-38
Rackmount Cable Management Kit (H3108-CR/CS) . . . . .	3-38
Wallmount Cable Management Bracket (H3108-CW) . . . . .	3-38
Rack Blanking Plates (H3108-BF, H3108-BE) . . . . .	3-38
Wall Partition Bracket (DERMS-CA) . . . . .	3-39
Security Lock (DERMS-EA) . . . . .	3-39
Patch Panel Wallmount Bracket (H3108-IA) . . . . .	3-39
Universal Equipment Shelf (H3108-TC) . . . . .	3-39
Fiber Splice Tray (H3108-TF) . . . . .	3-40
<b>DERMS Application Examples . . . . .</b>	<b>3-42</b>
Wallmount Application . . . . .	3-42
Workgroup Application . . . . .	3-42
Workgroup 90 Single Module Tray . . . . .	3-43
Fiber-Optic Distribution Module . . . . .	3-43
Passive Wiring Kit for Stackable Hubs (H3109-EA) . . . . .	3-43
<b>Tools — Adapters . . . . .</b>	<b>3-44</b>
<b>Tools — Fiber . . . . .</b>	<b>3-45</b>
<b>Tools — UTP and ScTP . . . . .</b>	<b>3-46</b>
<b>Tools — Coaxial . . . . .</b>	<b>3-47</b>
<b>Applications/Configurations for Active and Passive Components</b>	<b>4-1</b>
<b>Connecting Active Equipment to the Wiring System . . . . .</b>	<b>4-3</b>
<b>DEChub Platforms . . . . .</b>	<b>4-9</b>
DIGITAL MultiSwitch 900 . . . . .	4-10
Hub Manager . . . . .	4-11
DEChub 90 Backplane . . . . .	4-12
DIGITAL MultiStack System . . . . .	4-13



DEChub ONE . . . . .	4-13
DEChub ONE-MX . . . . .	4-14
<i>clear</i> VISN Overview . . . . .	4-14
DEChub Configurations . . . . .	4-17
<b>Local Area Network Applications . . . . .</b>	<b>4-19</b>
802.3/Ethernet Copper and Point-to-Point Fiber . . . . .	4-20
Bridges — Overview . . . . .	4-21
DECbridge 90FL Implementation . . . . .	4-21
Switches — Overview . . . . .	4-23
DECswitch 900EF Implementation . . . . .	4-23
Repeaters — Overview . . . . .	4-25
10BaseF LAN Repeaters Implementation . . . . .	4-25
10BaseT LAN Repeaters . . . . .	4-27
DECrepeater 90TS Implementation . . . . .	4-27
10Base2 LAN Repeaters . . . . .	4-30
DECrepeater 10Base2 Implementation . . . . .	4-30
Local Terminal Servers — Overview . . . . .	4-33
DECserver 900TM Implementation . . . . .	4-33
EtherWORKS Hub 8TX . . . . .	4-36
EtherWORKS Network Interface Cards . . . . .	4-36
EtherWORKS 3 Turbo, Network Interface Cards (DE204-AB, DE205-AB) . . . . .	4-36
EtherWORKS Turbo EISA NIC (AUI, BNC, TP) (DE425-AA) . . . . .	4-37
EtherWORKS Turbo PCI 10 Network Interface Card (DE450-xx) . . . . .	4-37
Fast EtherWORKS PCI 10/100 Adapter (DE500-AA) . . . . .	4-37
802.5/Token Ring Applications/Configurations . . . . .	4-39
802.5/Token Ring Overview . . . . .	4-40
DEChub 900 Token Ring Products . . . . .	4-40
802.5/Token Ring Network Application . . . . .	4-41
Configuration Highlights . . . . .	4-42
Cable Plant Component Requirements . . . . .	4-42
Configuration Requirements . . . . .	4-43
Horizontal Cabling Design . . . . .	4-44
<b>Wide Area Network Applications . . . . .</b>	<b>4-46</b>
Brouters, Routers, and RouteAbout Central . . . . .	4-47
RouteAbout Access Routers . . . . .	4-47
RouteAbout Central . . . . .	4-47
DECbrouters . . . . .	4-47
DECbrouter 90 Implementation . . . . .	4-47



DECwanrouter 90 Implementation . . . . .	4-49
Wireless . . . . .	4-51
RoamAbout Access Point . . . . .	4-51
<b>High-Performance Networks . . . . .</b>	<b>4-52</b>
High-Performance Networking with GIGAswitch/FDDI and GIGAswitch/ATM . . . . .	4-52
High-Performance Switched FDDI Backbone . . . . .	4-52
Ethernet to ATM . . . . .	4-53
LAN Emulation . . . . .	4-53
Switched Virtual Networks . . . . .	4-53
FDDI Applications/Configurations . . . . .	4-56
Recommended Topologies . . . . .	4-57
DECconcentrator (TP-PMD) UTP Application . . . . .	4-58
GIGAswitch Application . . . . .	4-60
<b>DIGITAL MultiSwitch 900 Configuration Examples . . . . .</b>	<b>5-1</b>
<b>Hub Structured Networking . . . . .</b>	<b>5-2</b>
Hub Power System Overview . . . . .	5-2
Power Allocation . . . . .	5-2
Guidelines for Calculating Power Needs . . . . .	5-3
<b>Comparison Tables . . . . .</b>	<b>5-4</b>
<b>Ethernet . . . . .</b>	<b>5-5</b>
<b>Token Ring . . . . .</b>	<b>5-6</b>
<b>FDDI . . . . .</b>	<b>5-7</b>
<b>Communication Servers . . . . .</b>	<b>5-8</b>
<b>Internetworking . . . . .</b>	<b>5-9</b>
<b>Management Products . . . . .</b>	<b>5-10</b>
 <b>Appendix A. Octopus Cables and Connecting Hardware</b>	
<b>Pinout Tables . . . . .</b>	<b>A-2</b>
H3117-LA/LB/LE Connector Pinout EIA/TIA-568 (T568A) . . . . .	A-4
H3117-LC/LD/LF Connector Pinout EIA/TIA-568 (T568B) . . . . .	A-4
Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables . . . . .	A-10
 <b>Appendix B. OPEN DECconnect Performance Specifications . .</b>	<b>B-1</b>
<b>OPEN DECconnect Super-5 System Specification . . . . .</b>	<b>B-2</b>

<b>Cable Specifications Horizontal — 4-Pair . . . . .</b>	<b>B-3</b>
DC Resistance . . . . .	B-3
DC Resistance Unbalance . . . . .	B-3
Mutual Capacitance . . . . .	B-3
Capacitance Unbalance: Pair to Ground . . . . .	B-3
Characteristic Impedance and Structural Return Loss (SRL) . . . . .	B-3
Near-end Crosstalk (NEXT) Loss . . . . .	B-4
OPEN DECconnect Screened High-Performance Interconnect Components . . . . .	B-6
OPEN DECconnect UTP Link Performance Specification . . . . .	B-6
Channel Attenuation . . . . .	B-8
<b>15-Year Application Assurance Warranty . . . . .</b>	<b>B-11</b>
 <b>Appendix C. Application/Configuration Rules . . . . .</b>	<b>C-1</b>
<b>802.3/Ethernet and Network Configuration Rules . . . . .</b>	<b>C-2</b>
IEEE 802.3 Transmission Model 1 . . . . .	C-2
IEEE 802.3 Transmission Model 2 . . . . .	C-2
<b>EIA-423 Configuration Rules . . . . .</b>	<b>C-3</b>
<b>802.5/Token Ring Configuration Guidelines . . . . .</b>	<b>C-4</b>
Cabling . . . . .	C-4
Multiple Hubs . . . . .	C-4
Unshielded Twisted-Pair Cable Configuration . . . . .	C-5
Shielded Twisted-Pair Configuration . . . . .	C-6
Cable Connector Specifications . . . . .	C-6
<b>FDDI Configuration Rules . . . . .</b>	<b>C-7</b>
Network Constraints . . . . .	C-7
Connection Rules . . . . .	C-7
 <b>Appendix D. Discontinued OPEN DECconnect Products . . . . .</b>	<b>D-1</b>
Discontinued Passive OPEN DECconnect Products . . . . .	D-2
Discontinued Active Products . . . . .	D-3
 <b>Appendix E. Reference Documents . . . . .</b>	<b>E-1</b>
Documentation Offered by Digital Equipment Corporation . . . . .	E-2
Documentation from Other Sources . . . . .	E-3
 <b>Glossary</b>	
<b>Index</b>	









## Introduction

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The *OPEN DECconnect Applications Guide* provides information to help you plan, install, and order networking systems based on DIGITAL's OPEN DECconnect Structured Wiring System and active networking products.

In addition, it provides applications and configuration information associated with the OPEN DECconnect product set and DIGITAL's networking equipment.

### ***Other Resources***

The *Network Products Guide* (EC-I7940-42) provides a complete guide to all of DIGITAL's networking products, services, and solutions, including product comparisons, specifications, prerequisites, and ordering information.

For the latest information on DIGITAL's products and network systems, see DIGITAL's home page at:

**<http://www.digital.com>**

For specific information on DIGITAL's network products, see the Network Product Business home page at:

**<http://www.networks.digital.com>**

The *Networked Computing Catalog* (EB-I7491-42) provides descriptions and ordering information for DIGITAL's networking products and options.

The *DIGITAL Systems and Options Catalog* (EC-I7260-10) is a comprehensive collection of current descriptive, ordering, and configuring information available for systems and hardware options (May 1996 edition). A supplement to this guide (May 1997) is now available (EC-I7896-10).

The *DEChub Network Configuration Guide* (EK-CONFIG-CG) provides detailed diagrams for specific configurations using a variety of media and active and passive components.

### **OPEN DECconnect Super-5 Product Set**

See Tables 1-1 and 1-2 for a list of products in the OPEN DECconnect Super-5 product set, descriptions, part numbers, and page references for more detailed product information.



Table 1-1: OPEN DECconnect Super-5 Product Set

Part Number	Product Description	Applications	Page
H3112-GV	Modular jacks for OPEN DECconnect faceplates or wallboxes	Snap-in data connectors for unshielded twisted-pair (UTP) cable (110 punchdown) wired to TIA/EIA T568A	3-7
H3112-HV	Screened modular jacks for OPEN DECconnect faceplates or wallboxes	Snap-in data connectors for screened twisted-pair (ScTP) cable (110 punchdown) wired to TIA/EIA T568A	3-7
H3112-IV	Modular jacks for OPEN DECconnect faceplates or wallboxes	Snap-in data connectors for UTP cable (110 punchdown) wired to TIA/EIA T568B	3-7
H3112-JV	Screened modular jacks for OPEN DECconnect faceplates or wallboxes	Snap-in data connectors for ScTP cable (110 punchdown) wired to TIA/EIA T568B	3-7
H8245-C	High-speed application UTP cable (PVC)	UTP high-performance, Category 5 data grade cables	3-16
H8246-C	High-speed application UTP cable (plenum)	UTP high-performance, Category 5 data grade cables	3-16
H8245-AC	UTP building wire 100% tested up to 350 MHz	UTP, 4-pair, 24 AWG, Category 5 non-plenum 1,000 ft reel — Ultra Performance	3-16
H8245-BC		UTP, 4-pair, 24 AWG, Category 5 non-plenum 1,000 ft box — Ultra Performance	3-16
H8246-AC		UTP, 4-pair, 24 AWG, Category 5 plenum 1,000 ft reel — Ultra Performance	3-16
H8246-BC		UTP, 4-pair, 24 AWG, Category 5 plenum 1,000 ft box — Ultra Performance	3-16
H8247-AC		UTP, 25-pair, 24 AWG, Category 5 non-plenum 1,000 ft reel — Ultra Performance	3-16
H8248-AC		UTP, 25-pair, 24 AWG, Category 5 plenum 1,000 ft reel — Ultra Performance	3-16
BN26S-03	Screened office cable supporting copper FDDI devices in an office environment (DTE to DTE)	8-pin MP to 8-pin MP ScTP office cable for TP-PMD Interface	3-21
BN25H-03	Unshielded office cable supporting copper FDDI devices in an office environment (DTE to DTE)	8-pin MP to 8-pin MP UTP cable for TP-PMD interface	3-11
BN26M-xx	Four twisted-pair, screened stranded cable	8-pin MP to 8-pin MP ScTP TIA/EIA data grade equipment/office cable	3-21



Table 1-1: OPEN DECconnect Super-5 Product Set

Part Number	Product Description	Applications	Page
H8240-A	Used to make custom cables for applications requiring high-speed data transmission. <b>For Office Use Only</b>	UTP high-performance data grade stranded cable for office cable assemblies	3-12
H8240-B	Eight-conductor, screened (ScTP) four-pair cable to make office cable only. <b>For Office Use Only</b>	High-performance data grade ScTP cable	3-21
BN24Q-xx	Crossover 100BaseTX/T4 local connection (DTE to DTE)	8-pin MP to 8-pin MP UTP TIA/EIA data grade equipment/office cable	3-11
BN28Q-xx	Crossover 100BaseTX/T4 screened local connection (DTE to DTE)	8-pin MP to 8-pin MP ScTP TIA/EIA data grade equipment/office cable	3-21
BN25G-xx	Four unshielded, twisted-pair, stranded cable	8-pin MP to 8-pin MP TIA/EIA data grade equipment/office cable	3-11
H3117-LA	Insert for H3108 and H3109 family of patch panel eight connectors	Snap-in 8-pin MJ to 110 punchdown patch panel insert kit wired to TIA/EIA-T568A	3-3
H3117-LB H3117-LE		Snap-in 8-pin screened MJ to 110 punchdown TIA/EIA-T568A	3-3
H3117-LC		Snap-in 8-pin MJ to 110 punchdown patch panel insert kit wired to TIA/EIA-T568B	3-3
H3117-LD H3117-LF		Snap-in 8-pin screened MJ to 110 punchdown TIA/EIA-T568B	3-3
H3117-NC		Snap-in 8-pin MJ connected back-to-back to emulate a coupler wired to TIA/EIA-T568A or TIA/EIA-T568B	3-3
		<b>European Cables</b>	
H8245-CA	High-performance building wire (ScTP/FTP)	Screened (ScTP, FTP) 4-pair Category 5, 24 AWG PVC, 305 m	3-21
H8246-CA		4-pair Category 5, 24 AWG LSZH, 305 m (FTP, ScTP)	3-21
H8247-CA		Dual 4-pair Category 5, 24 AWG PVC, 305 m (FTP, ScTP)	3-21
H8248-CA		Dual 4-pair Category 5, 24 AWG LSZH, 305 m (FTP, ScTP)	3-21
H8245-AA	High-performance building wire	UTP, 4-pair, 24 AWG, Category 5 PVC 1,000 ft reel	3-16
H8246-AA		UTP, 4-pair, 24 AWG, Category 5 LSZH 1,000 ft reel	3-16
H8247-AA		UTP, dual 4-pair, 24 AWG, Category 5 PVC 1,000 ft reel	3-16
H8248-AA		UTP, dual 4-pair, 24 AWG, Category 5 LSZH 1,000 ft reel	3-16



**Table 1-2: OPEN DECconnect Super-5 Voice Networking Interconnect Product Set**

<b>Part Number</b>	<b>Product Description</b>	<b>Application</b>	<b>Page</b>
H3208-AA	Punchdown terminal block for voice or high-speed data transmission	110 IDC terminal block, 50 pair with mounting legs	3-17
H3208-AB		110 IDC terminal block, 100 pair with mounting legs	3-17
H3208-AC		110 IDC terminal block, 300 pair with mounting legs	3-17
H3208-BB		110 IDC terminal block, 50 pair without mounting legs	3-17
H3208-BC		110 IDC terminal block, 100 pair without mounting legs	3-17
H3217-AB		110 IDC terminal block, 50 pair with 4-pair connector kit	3-17
H3217-AC		110 IDC terminal block, 100 pair with 4-pair connector kit	3-17
H3217-AD		110 IDC terminal block, 300 pair with 4-pair connector kit	3-17
H3217-AE	TIA/EIA Category 5 connecting block	110 IDC connector block, 3 pair	3-17
H3217-AF		110 IDC connector block, 4 pair	3-17
H3217-AG		110 IDC connector block, 5 pair	3-17
BN25U-01	Patching/interconnect cable	110 to 8 MP cable, 1 meter	3-12
BN25U-02		110 to 8 MP cable, 2 meter	3-12
BN25U-03		110 to 8 MP cable, 3 meter	3-12
BN25V-01		110 to 110 cable, 1 meter	3-12
BN25V-02		110 to 110 cable, 2 meter	3-12
BN25V-03		110 to 110 cable, 3 meter	3-12



Table 1-3: Application Interconnect for Category 5 and Fiber Cable Assemblies

Application	Media Type	Office Cable	Equipment Cable	Comments
Ethernet	UTP (10BaseT)	BN25G	BN25G	
		BN24Q		Local Crossover Cable (DTE to DTE)
			BN25U	110 IDC to 8-Pin MJ
			BN26U	Eight 8-pin to 50-pin DECRepeater 900GM
	ScTP (10BaseT)	BN26M	BN26M	
		BN28Q		Local Crossover Cable (DTE to DTE)
	Fiber (10BaseF)	BN34C	BN34C	ST to ST MultiMode Dual (Metal Bayonet)
		BN34A	BN34A	ST to SC MultiMode Dual
		BN34B	BN34B	SC to SC MultiMode Dual
	Coax (10Base2)	BC16M	BC16K	BNC to BNC
		BN24A	BC16K	Office Daisy-Chain to BNC
Fast Ethernet	UTP (100BaseT)	BN25G	BN25G	
		BN24Q		Local Crossover Cable (DTE to DTE)
			BN25U	110 IDC to 8-Pin MJ
	ScTP (100 BaseT)	BN26M	BN26M	
		BN28Q		Local Crossover Cable (DTE to DTE)
	Fiber (100BaseFX)	BN34C	BN34C	ST to ST MultiMode Dual (Metal Bayonet)
		BN34A	BN34A	ST to ST MultiMode Dual
		BN34B	BN34B	SC to SC MultiMode Dual
	FDDI	BN25G	BN25G	
		BN25H		Local Crossover Cable (DTE to DTE)
		BN26M	BN26M	
	ScTP (TP-PMD)	BN26S		Local Crossover Cable (DTE to DTE)
	Fiber	BN24B	BN24B	ANSI MIC to MIC
		BN24D	BN24D	ANSI MIC to ST
		BN34D	BN34D	ANSI MIC to SC



## Structure of This Guide

The *OPEN DECconnect Applications Guide* contains the following chapters:

Chapter	Contents
1 Introduction	Provides an overview of the guide and explains how to find the information quickly and easily.
2 OPEN DECconnect System Overview	Identifies steps for planning and installing a network, describes how OPEN DECconnect satisfies network requirements, and provides an overview of the OPEN DECconnect architecture.
3 OPEN DECconnect System Components	<p>Contains information about the following:</p> <ul style="list-style-type: none"> <li>• <b>Passive Building Wiring Components</b> Describes and illustrates the passive components (for example, office outlets and connectors, device-specific cables, and adapters) that provide the connections between active components.</li> <li>• <b>LAN Implementation Tools</b> Describes implementation tools and test equipment recommended for installing and testing the OPEN DECconnect system.</li> </ul>
4 Applications/Configurations for Active and Passive Components	Provides configuration/application examples for hub platforms and products, 802.3/Ethernet products, EIA-423 products, Token Ring products, FDDI products, and multivendor products.
5 DIGITAL MultiSwitch 900 Configuration Examples	Provides tables containing information on power consumption, connector configuration, number of ports, and so forth.
<b>Appendices</b>	Contains information about cabling, optional components, reference documents, network services, and so forth.
A: Cables and Connecting Hardware Pinout Tables	Illustrates the pinout diagrams for various connecting cables.
B: OPEN DECconnect Performance Specifications	Provides tables and graphs of network link performance of OPEN DECconnect specifications and other technical data.
C: Application/Configuration Rules	Provides definitions of the standards-based configuration rules for 802.3, 802.5, FDDI, 10BaseT, 10BaseF, and so forth.
D: Discontinued OPEN DECconnect Products	Provides a list of discontinued OPEN DECconnect products and their replacements.
E: Reference Documents	Lists pertinent documentation and order codes available from DIGITAL and other sources.
<b>Glossary</b>	
<b>Index</b>	









## OPEN DECconnect System Overview

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Digital Equipment Corporation's OPEN DECconnect System provides a comprehensive solution for supplying physical connections between individual network devices on a local area network (LAN). Standards-based, the OPEN DECconnect System accommodates networks — from the smallest LAN to a global multivendor network with products that have been stringently tested at the component and system level. The OPEN DECconnect System supports worldwide services to design, install, and manage networks that protect customers' network investments.



## OPEN DECconnect System

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Today's rapidly changing data communications market puts a premium on implementing data network cabling systems that can withstand the test of time. These cabling systems must be able to support all of the devices currently attached to the systems, and provide flexibility for future growth in the number of users and available bandwidth. The systems should serve users' needs for the facility's lifetime.

OPEN DECconnect is designed to run a wide array of application technologies and vendor platforms while providing true distributed computing by integrating terminals, personal computers, and workstations into the enterprisewide network. OPEN DECconnect offers a full range of media choices, while providing flexibility and modularity for network growth. The focus of OPEN DECconnect is on the use of:

- Fiber optics for the network backbone and horizontal LAN connections to allow capacity for high-traffic network usage
- OPEN DECconnect Super-5 (TIA/EIA Category 5), twisted-pair, fiber-optic backbone cabling, and, where necessary, fiber-optic cabling for horizontal wiring and work area/office connections

The OPEN DECconnect structured wiring supports fiber and copper information system solutions for applications such as:

- **Data** — FDDI, TP-PMD, IEEE 802.3/Ethernet, 100BaseTX, 100BaseT4, 10BaseT, 10Base2, 10Base5, 10BaseF, 802.5/Token Ring 4 Mb/s and 16 Mb/s, EIA-232, EIA-423, EIA-422, Apple, LocalTalk, IBM 3270, IBM AS/400E 3X Series, and ATM
- **Imaging** — Plotters, facsimile machines, and graphics stations
- **Sensing** — Building management
- **Video** — Interactive teleconferencing or security
- **Voice** — Telephone and intercom

### OPEN DECconnect Architecture

The OPEN DECconnect Architecture is based on the TIA/EIA Building Standard Architecture consisting of the five basic subsystems: campus, building, horizontal, work area, and administration subsystem.

For the last several years, the Electronics Industries Association (EIA), at the request of the Computer Communications Industry Association (CCIA), has been developing a standard for telecommunications building wiring. The Telecommunications Industry Association (TIA), and each of the major U.S. computer manufacturers, including DIGITAL, have also been involved in developing this standard. This level of support facilitates widespread customer acceptance of the TIA/EIA standard for commercial building wiring.

This TIA/EIA-568A standard, which addresses voice and data using both copper and fiber, is now the structured wiring standard for commercial office buildings. The standard specifies topology, distances, media, and connectors to provide an application-independent cable plant with the goal of becoming a utility.

To support the building wiring standards, the OPEN DECconnect System has been upgraded to become a more scalable cabling system from the Main Cross-Connect (MC) to the office. Product enhancements to OPEN DECconnect have made it fully compliant with the TIA/EIA-568A standard and the international ISO/IEC 11801 standard.



## TIA/EIA-568A Commercial Building Wiring Architecture Standard

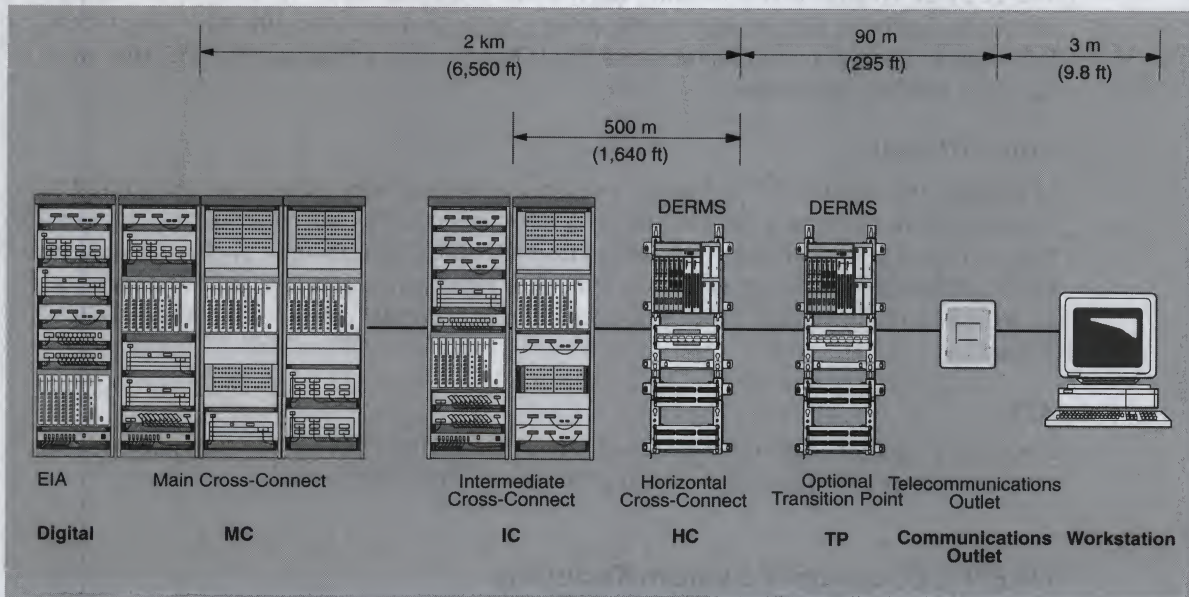
The TIA/EIA-568A Commercial Building Wiring Standard defines telecommunications wiring for one building or multiple buildings in a campus environment. The standard specifies wiring system parameters, including:

- Topology
- Distances
- Media and connector-pin assignments

The *TIA/EIA-568A Commercial Building Wiring Standard* recognizes two types of wiring:

- Horizontal cabling
- Backbone cabling

Figure 2-1 illustrates the *TIA/EIA-568A Commercial Building Wiring Standard* distance limitations and distribution subsystems for TIA/EIA-568A and OPEN DECconnect. DIGITAL recommends the hierarchical physical star network topology as prescribed by this standard. Within this structure OPEN DECconnect also supports other topologies such as ring, bus, and point-to-point configuration.



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Figure 2-1: TIA/EIA-568A Distance Limitations and Distribution Subsystems



## **DIGITAL's Adherence to Standards**

The development of standards to control the design and implementation of the physical network has benefited customers and manufacturers of network components. Standards expand the network's value, making it possible to support products from multiple vendors. DIGITAL is a charter member of the TIA/EIA standards body and continues to support the development of open networking solutions. The company's involvement with standards — both current and evolving — can clearly be seen in the OPEN DECconnect System, which allows the integration of networking products across all standard media types. Today, for example, the OPEN DECconnect System is flexible enough to accommodate FDDI network connectivity using 100-ohm UTP/ScTP/FTP cable, 150-ohm STP, or ThinWire coaxial cable. This demonstrates DIGITAL's commitment to existing investments by allowing expanded use of installed cable, while supporting new media currently being defined by standards.

### ***Compliance with Current and Evolving Standards***

The OPEN DECconnect System addresses physical management of the cable medium connecting the active products required to support the network. This system supports connectivity starting at the active port in the equipment room through the faceplate and office equipment cable. All components are specified to be compliant with national and international standards.

Commitment to current and evolving standards ensures that the breadth of products needed to support local Public Telephone & Telegraph (PTT) and Electromagnetic Compatibility (EMC) requirements are available from DIGITAL.

## **Increased Data Transmission Support**

The industry anticipates significant advances in data transmission support.

### ***Twisted Pair***

The TIA/EIA TR-41.8.1 Subcommittee has released specifications for twisted-pair cables and connecting hardware that specifies media at signaling frequencies up to 100 MHz. The OPEN DECconnect Super-5 system also supports the ATM specification that specifies 155 Mb/s over Category 5 twisted-pair cabling.

### ***FDDI (TP-PMD)***

In addition, the ANSI X3T9 Technical Committee established specifications allowing FDDI data rates to be transmitted over (UTP) Category 5 interconnect cables and components. This application, identified as TP-PMD, is differentiated from the 100 Mb/s fiber-optic application defined as FDDI. Although the data rate is 100 Mb/s, the peak signal power is below 31.25 MHz because of the MLT3 encoding scheme. (MLT3 is specified in the TP-PMD portion of the ANSI X3T9.5 standard.)

### ***ATM***

Emerging asynchronous transfer mode (ATM) implementations will specify encoding methods that can support 155 Mb/s data rates using Category 5 UTP/ScTP cabling.

## **OPEN DECconnect System Topology**

To develop a structured data network, the OPEN DECconnect System provides products within the Main Cross-Connect (MC), Intermediate Cross-Connect (IC), Horizontal Cross-Connect (HC), and optional Transition Point (TP). OPEN DECconnect supports the TIA/EIA-568A Commercial Building Wiring Standard and the IEC/ISO 11801 Standard.





## OPEN DECconnect Super-5 System (TIA/EIA Category 5)

DIGITAL has developed a complete Category 5 (Super-5) system consisting of cables, patch cords, and connectors to support TIA/EIA-568A, which defines the highest system performance in the industry. DIGITAL had taken the lead in specifying the highest performing UTP media for use in a network in advance of the release of the TIA/EIA Category 5 cable specification defined in TSB36 — the standard created by the working group responsible for defining cable category specifications.

This system of components is part of the Category 5 structured wiring system and includes Category 5 connectors, patch cords, and building cabling. These components support the transmission of high-speed data, which is defined today by ANSI X3T9 TP-PMD for FDDI including IEEE 802.10B/T Ethernet standards along with the ATM standard.

DIGITAL's involvement does not end with the product. As with other OPEN DECconnect products, DIGITAL supplies the components — in this case, Category 5 — and workmanship practices and procedures to ensure that the installed network meets system performance specifications. Along with the installation procedure, DIGITAL is establishing verification processes to ensure that the network performs to specification. Customers using the OPEN DECconnect System's Super-5 (TIA/EIA Category 5) products will have a system composed of the highest quality components backed by the expertise needed to build the network.

## OPEN DECconnect Screened High-Performance Interconnect Components

### *Shielded Versus Screened*

Two types of twisted-pair cables incorporate shielding: shielded cable (STP) and screened cable (ScTP/FTP). Shielded cable provides individual shields for each wire pair and an overall shield covering the individual shielded pairs. Screened cable incorporates only an overall shield covering the unshielded pairs included in the cable. Most 100-ohm twisted-pair cables that incorporate shielding are of the screened variety. DIGITAL supplies a complete line of screened connectors and cables. DIGITAL developed and specified the OPEN DECconnect screened cables and connectors to meet the same specifications defined in TIA/EIA-568A (Category 5 UTP).

The IEC/ISO 11801 standard covers generic cabling for the customer premises. This standard specifies 100-ohm shielded/screened twisted-pair cable as one cable type used in the customer premises and defines the performance of that cable using the same parameters defined by TIA/EIA-568A with the addition of a transfer impedance specification. DIGITAL tested its screened system to ensure compliance with the performance specifications. The company continually monitors standards activity to ensure that its screened system meets all specifications.

## Categorizing Networking Components: Considerations for Implementing Category 5

The TIA/EIA-568A standard defines the performance of twisted-pair cables and associated connectors in three categories: Category 3 specifies the performance of copper cables and connectors from 1 MHz to 16 MHz; Category 4 defines performance from 1 MHz to 20 MHz; Category 5 specifies performance from 1 MHz up to 100 MHz; and Category 5 specifies the highest level of performance available for 24 AWG unshielded twisted-pair cable. Cables meeting this performance level are specified by the ATM standard to support data rates of up to 155 Mb/s.





### ***FDDI (TP-PMD) 100 Mb/s over UTP***

The performance requirements of 100 Mb/s data transmission are not directly correlated to the 100 MHz specification stated for Category 5 connectors. Two factors are involved. First, the current implementation of the 100 Mb/s data transmission uses a method of encoding (MLT3) that reduces the maximum required channel bandwidth to 31.25 MHz. Second, the pairs selected to carry 100 Mb/s transmission are generally those that are farthest apart.

TP-PMD specifies pins 1-2 and 7-8 on the 8-pin MJ for cable pair termination. Therefore, the near-end crosstalk (NEXT) in the connector is significantly reduced for those pairs, and consequently many of the existing connectors meet the performance limits on those two pairs.

This example does not diminish the importance of the Category 5 limits or imply that these connectors qualify as Category 5, but rather shows that in some cases existing connectors may not need to be replaced to support 100 Mb/s data rates. Category 5 system components are recommended to provide the required margin for supporting future high-speed communications.

### ***Category 5 Implementation Without Significant Changes***

Many of today's data systems that have evolved from the structured voice wiring systems use Cross-Connect termination fields. Category 5 components used to build high-speed networks are affected by including traditional termination fields. The use of 110-style Cross-Connect fields may not support Category 5 applications unless special Category 5 patch cords are used. In contrast, the OPEN DECconnect System was designed to avoid this cable management method, and easily accommodate Category 5 implementations without significant changes beyond installing the new components.

### ***High-Performance Voice Networking Components***

DIGITAL offers a complete set of components that support the distribution of the voice network. These products are based on 110-style insulation displacement connector (IDC) technology. Most of the connector assemblies have been verified to Category 5 limits and can support voice or data within the building's structure. This allows the development of an integrated network composed of both OPEN DECconnect Super-5 voice and data interconnect products.

The data and voice products are completely compatible and work together or separately. This allows the design to evolve to meet customers' needs in the multimedia environment. This system is ideally suited for the voice network structure but is not limited to that role. The system is built with the highest performing cables and connectors, and can support the integration of high-speed Ethernet, FDDI (TP-PMD), and ATM.

## **OPEN DECconnect: Vendor- and Product-Independent Wiring**

OPEN DECconnect, introduced in February 1986, had two components: a primarily copper-based structured cabling system and active network hardware products. It has since evolved beyond its copper-based structured cabling system to one that is open and truly multivendor in nature, and focuses on the use of fiber optics for the network backbone. The OPEN DECconnect System includes all the passive networking products that provide for standards-based networks. The OPEN DECconnect System's structured cabling system is a vendor- and product-independent wiring system that is:

- Based upon TIA/EIA, IEEE 802, and ANSI standards, and stresses the use of fiber-optic cabling for network backbones and copper cabling for work area connectivity, with fiber-optic support to the desktop when required
- An application-independent structured cabling system



The key features of OPEN DECconnect are:

- Open, nonproprietary system
- Full multivendor support
- Increased modularity and flexibility
- Multimedia support
- Backwards compatibility with existing products
- Ultra Performance Category 5 cable, 100% tested up to 350 MHz

### **OPEN DECconnect Summary**

OPEN DECconnect, the result of years of development, focuses on the network as a system. Many of the design decisions in the early development phases considered the network's future needs.

Today, requirements to support twisted-pair networks at 100 MHz, with data rates of 100 Mb/s and beyond, are possible through:

- extensive planning in advance of standards implementation
- networking solutions tested at the component, system, and application levels
- products designed to meet the highest available system performance specifications and standards
- a worldwide support organization

The OPEN DECconnect System protects customers' investments in existing wiring, while accommodating the industry's highest performance specifications.

### **OPEN DECconnect Warranty**

Digital Equipment Corporation warrants that, for a period of fifteen (15) years following customer acceptance, DIGITAL's OPEN DECconnect passive wiring components will transport data in accordance with the cable channel specification in effect at the time of acceptance. DIGITAL, at its option, will repair or replace any defective cable channel component that causes the channel to fail to meet the original design specification within the warranty period.

This warranty is effective only if the cable channel is designed and installed by DIGITAL's authorized reseller, in accordance with DIGITAL's approved design specifications, and is operating at the customer's original location. This warranty only covers the passive network components approved and specified by DIGITAL, and is intended for use with active network interface products certified by the manufacturer to comply with the cable channel specification released by the major standards organizations in effect at the time of installation. Future network upgrades, changes, applications, and/or requirements are covered by the warranty only if the installation is performed by DIGITAL's authorized resellers, and are tested and verified in accordance with the latest version of DIGITAL's cable channel specification.



## Media and Network Planning

Media and network planning provides a framework for the management of heterogeneous, multivendor systems. An effective network management and planning system allows network personnel to meet specific organizational goals and technical needs.

### Structured Cabling Systems: Planning for the Future

A well-planned structured cable plant allows network planners and managers to accommodate virtually any number of moves easily, inexpensively, and without disruption to the organization.

#### *Advantages of Structured Cabling*

Because the cabling infrastructure is such a crucial part of a local area network, proper planning and execution of building topology mapping is critical to its success. Structured wiring ensures properly designed pathways; its importance cannot be overemphasized. See Table 2-1 for a comparison of structured and unstructured wiring.

A structured cabling system consists of various families of components including: transmission media (cables); circuit administration; and other hardware such as communication connectors, jacks, plugs, adapters, baluns, and transmission electronics.

A well-designed structured cabling system such as OPEN DECconnect is independent of the equipment it connects. The structured cabling system should also be capable of interconnecting many different communication devices such as data terminals, analog and DIGITAL telephones, personal computers, and host computers.

**Table 2-1: Comparison of Structured and Unstructured Cabling**

Structured Cabling	Unstructured Cabling
Standards based	Non-standards based
Application independent	Prone to application dependency
Allows movement of people and equipment without rewiring	Often requires rewiring when moving people or equipment
Allows for growth and change	Does not allow for easy growth and change
Easy to reconfigure wiring and communication equipment	Difficult to reconfigure wiring and communications equipment
Modular design allows flexibility	Non-modular, inflexible system
Allows for administration and maintenance of the cable plant; facilitates the isolation of equipment and cable problems	Generally not labeled and documented; limited management and problem isolation capabilities
Defines distance and topology	Free form
Reduces cost of ownership	High cost of ownership



## LAN Cable Media Applications and Selection Considerations

Data communications technological advances have been outpacing changes in most other areas including cable design. These advances have brought qualitative and exponential increases in data speed (for example, 9.6 Kb/s to 155 Mb/s) in just over a decade. Cable technology needs to meet this technological growth. Recent trends show:

- A growing number of users requiring connections to LANs
- A proliferation of multivendor-based LANs requiring support for a variety of equipment from different vendors
- An increasing demand by users for more LAN bandwidth

### *Cable Media Selection Criteria*

Selecting the proper cable medium requires a thorough understanding of three key factors:

- Intended applications of the LAN
- Size and structure of the building
- Anticipated growth of the network and its application speed

Three major cost factors influence the selection of the cable media:

- Initial cost for the cable, connectors, patching hardware, and labor for installation
- Investment protection provided by the cable over its useful life, and by adherence of equipment and installations to industry standards
- Versatility of the cable to handle voice, video, and other forms of high- and low-speed data communications, resulting in maximizing returns on investments

Network technical requirements for cable media usually include the expected data rate needed, distance coverage, immunity to noise, troubleshooting, security, and the move, add, and change capabilities. The decision for appropriate media selection should be based on:

- Requirements for current applications
- Minimal risks such as financial and safety, while evaluating the opportunity costs
- Flexibility for changes
- Capability of expansion/growth for additional and future applications and users
- Investment protection provided by the cable over its useful life and through adherence to industry standards

## Cabling Choices

DIGITAL's LANs support all of the following media choices for: unshielded (UTP) and screened (ScTP/FTP) twisted-pair cable, fiber-optic cable, ThinWire (coaxial), and baseband cable.

### *Twisted-Pair Cable*

Twisted-pair cable was first developed to support voice networks. Expanding the use of twisted-pair, DIGITAL and other computer vendors use twisted-pair for data communication between high-speed workstations and terminal connections.

Due to its low cost, twisted-pair is ideally suited for connecting the work area equipment to the network. Unshielded (UTP) and screened (ScTP/FTP) are two types of 100-ohm, twisted-pair cabling which support Category 3 and Category 5 variations. The OPEN DECconnect system also offers and **Ultra Performance** Category 5 UTP cable that is 100% tested up to a frequency of 350 MHz. DIGITAL recommends using Category 5 cabling for structured wiring.



**Twisted-Pair Cable Applications**

Twisted-pair cable manufacturers have grouped these cables according to performance levels. NEMA, UL, ISO, and TIA/EIA have released specifications that group 100-ohm UTP and ScTP cables into five performance-grade categories. These categories define certain standards requirements, data-transmission rates, and specific transmission parameters for each group of cables.

OPEN DECconnect recommends high-performance data grade (Category 5) twisted-pair cables to cover the majority of Physical layer LAN applications. Table 2-2 indicates the choices of horizontal cable media along with information on what types of applications are presently supported.

**Table 2-2: Application Versus Media Type**

Physical Layer Application	Horizontal Media Type				
	Fiber	ThinWire	UTP <sup>1</sup> / Category 3	UTP/ Category 5	ScTP <sup>2</sup> / Category 5
EIA-232			X	X	X
EIA-422			X	X	X
EIA-423			X	X	X
ISDN			X	X	X
IEEE 802.3 10Base2		X			
IEEE 802.3 10BaseT			X	X	X
IEEE 100BaseT				X	X
Ethernet Synchronous (10BaseF)	X				
IEEE 802.3 FOIRL	X				
IEEE 802.5 4 Mb/s			X	X	X
IEEE 802.5 16 Mb/s <sup>3</sup>			(limited distance)	X	X
ANSI/ISO FDDI	X				
TP-PMD				X	X
LocalTalk			X	X	X
IBM 3270			X	X	X
IBM AS/400 3X			X	X	X
ATM				X	X

<sup>1</sup>UTP is unshielded 4-pair, 22- and 24-gauge, 100-ohm twisted-pair.

<sup>2</sup>ScTP/FTP is screened 4-pair, 22- and 24-gauge, 100-ohm twisted-pair.

<sup>3</sup>16-Mb/s Token Ring can be supported over Category 3 UTP provided that the cabling has been tested and verified to meet the Category 3 specifications and distance limitation requirements.



## Twisted-Pair Connector Pin Assignments TIA/EIA-T568A

The OPEN DECconnect snap-in 8-pin modular data jacks (H3112-E/F/G/H series) conform to the TIA/EIA-T568A preferred pin-pair assignments. This pin/pairing meets ISO 8877 requirements. The H3112-IV/JV data jacks conform to the TIA/EIA-T568B pin-pair assignments. See Figure 2-2.

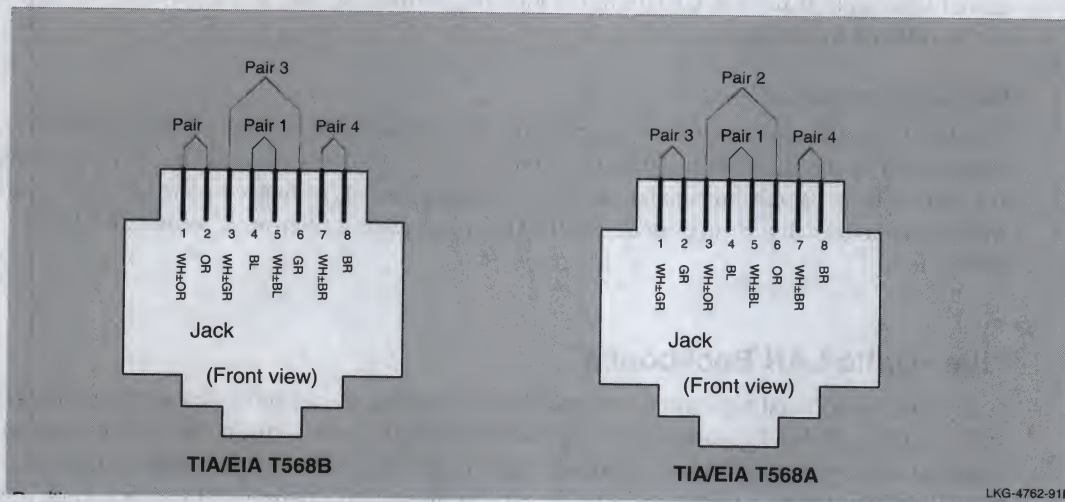


Figure 2-2: 8-Pin Modular Jack Assignments (TIA/EIA-T568A/T568B)

Table 2-3: Applications in Conjunction with Pin Assignments (TIA/EIA-T568A Pin-Pair Assignments)

Application	Pair 3 Pins 1, 2	Pair 2 Pins 3, 6	Pair 1 Pins 4, 5	Pair 4 Pins 7, 8
ISDN	Power	Transmit	Receive	Power
Analog Voice	—	—	Transmit/Receive	—
IEEE 10BaseT	Receive	Transmit	—	—
IEEE 100BaseTX	Receive	Transmit	—	—
IEEE 100BaseT4	Receive	Transmit	Bidirectional (BI)	Bidirectional (BI)
EIA-423 DL (only)	Receive	Transmit	—	—
EIA-423	Receive	Transmit	—	Ready In/Out
EIA-423 DL and Modem Control	Receive	Transmit	CTS/RTS Modem	Ready In/Out
IEEE 802.5/Token Ring	—	Transmit	Receive	—
TP-PMD for UTP	Transmit			Receive
ATM	Transmit			Receive



### ***ThinWire 802.3/Ethernet Coaxial Cable***

ThinWire coaxial cable, a variant of RG 58 cable, meets 802.3 base specifications for thin coaxial cable. It is flexible and cost effective, particularly when small groups of PCs, workstations, and servers are connected in a work group on one segment. ThinWire is ideally suited when a daisy-chain PC network is the low-cost preferred topology. However, note that daisy-chained segments can be difficult to manage.

### ***Baseband Coaxial Cable***

Standard baseband coaxial cable is the traditional backbone cable for 802.3/Ethernet networks. It is supported by the IEEE 802.3 10Base5 standard, and is relatively easy and inexpensive to install and add stations. Baseband coaxial cable can replace hundreds of twisted-pairs in a backbone. Although coaxial cable is supported, DIGITAL recommends a fiber-optic solution for the backbone.

## **Fiber-Optic LAN Backbones**

Today's networks need to support high-speed data, imaging, voice, and video applications. Fiber optics, with its ability to support higher speeds, multiple data protocols, better security, and an extended network span, plays a crucial role at the backbone level. Copper cabling, such as thin coaxial and twisted pair, continues to be the predominant cable connecting the office to the fiber network. This will be true until the cost of fiber optics decreases to the same level as copper, unless specific applications warrant the bandwidth offered by fiber optics to the desk.

The following factors contribute to the copper-to-fiber migration in campus and building wiring, and give fiber-optic media advantages over copper:

- High bandwidth and a much higher data transfer rate
- Increased distance support with lower bit error rates (BER)
- Protection from ground potential differences and electromagnetic interference
- Small diameter and lighter weight cables
- Low attenuation carrying data longer distances than other media
- Decreasing fiber-optic cable and component costs
- High level of security
- Vendor and application independence

Based on current use and future capabilities, fiber is cost competitive as a backbone, particularly with the growth in the number of networked users combined with high bandwidth, networked applications (such as distributed databases, client/servers, virtual LAN (VLAN) records management, and CAD/CAM). Multimode fiber can be used for current LANs at the 850-nm window and for LANs at the 1300-nm window supporting FDDI at 100 Mb/s. If FDDI LANs become saturated, the traffic load can be handled by adding more multimode fiber or by moving up to a new generation LAN using single-mode fiber.



## Structured Networking

### *Basic Considerations*

The network's structure determines how effectively and efficiently an enterprise communicates within its own organization and with the rest of the business community. The network's configuration helps to maximize the productivity of individuals, departments, and the enterprise.

The increased productivity resulting from a specific networking solution must be weighed against the cost of that solution, and the performance and reliability of each technology must be considered not only for the present but also for the future.

Since the network architecture reflects the business architecture and, ultimately, the enterprise's success, the following elements must be weighed carefully to determine which type of networking structure best suits the organization's requirements:

- What networking or communications standards fit the needs of the enterprise?
- How much bandwidth does each department require for data communications?
- Which communications wiring scheme provides functional growth, flexibility, and cost efficiency?

### *DIGITAL's DEChub Products*

Since DIGITAL's hubs perform within a consistent architecture, they scale well; that is, they adjust to communications requirements as the network grows and changes. This feature allows the implementation of networks as little or as large as an enterprise requires — even starting with one or two single-slot hubs. The network can then scale up — adding the incremental cost of just one piece of equipment at a time with the assurance that everything works together properly.

With the DEChub family, a network can be designed that will:

- Physically co-locate network hardware to reduce problem isolation and error recovery time
- Reduce plant cabling at a site
- Maintain the functionality of a centralized, common management tool
- Provide access to resources for distributed work groups
- Provide interconnection of heterogeneous media types
- Provide heterogeneous LAN interconnection
- Provide appropriate bandwidth to users under Network Management Control
- Allow for reconfiguration on error detection and for bandwidth allocation
- Allow maximum flexibility for moves, adds, and changes

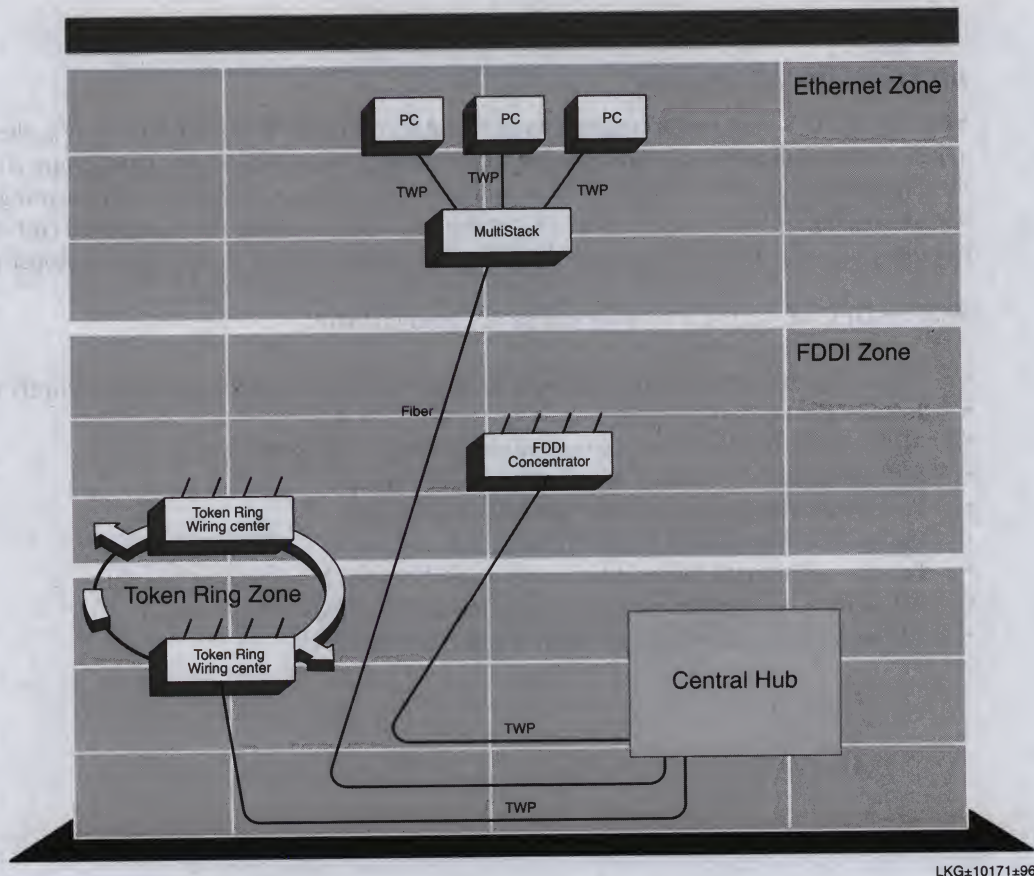


### Zone Distribution Model

In a zone distribution environment, work groups are small and may be geographically distant from each other. A zone distribution model may contain multiple LAN technologies or one LAN technology. The basis of zone distribution is wiring one cable to a remote group and attaching a single- or multiple-slot hub (MultiStack or ONEhub) near the work site as opposed to running multiple wires from the hub to the work site. This topology is flexible, inexpensive, easy to implement, and is usually a part of a larger network.

The zone distribution model is used when a small work group:

- requires LAN connections
- is added to an existing LAN



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**Figure 2-3: Zone Distribution Model**



### Zone Distribution MultiStack Rack Pack

The plug-and-play OPEN DECconnect packaged work group system is a solution that allows a small business or company to deliver a simple, and easy-to-use work group system. This solution integrates DIGITAL's MultiStack system and a selection of the OPEN DECconnect network components into a single package that complies with the TIA/EIA-568A Building Wiring Standard and the ISO11801 cabling standards.

DIGITAL's OPEN DECconnect packages let you simply and cost-effectively interconnect from one to 48 users. When expanding the basic kit, multiple options are available including UTP, ScTP, fiber optic, coaxial, patch panel inserts, and the Modular Mounting System wallmount options.

The packaged systems approach using DIGITAL's OPEN DECconnect modular mounting products provides the easiest method for structuring the wiring in a work group or stackable environment. There is minimum use of tools and the system snaps together with little effort. The entry-level system supports, and can expand to support, the maximum allowable MultiStack configuration. The basic 16-user package can be expanded to support up to 48 ports on a single patch panel. Up to three, 16-port, DECpeater 90T-16 options can be mounted in this package. Any combination of media including fiber optics can be supported. As the system grows, none of the original investment is lost. All the existing products can be added to a larger configuration, either wall or rackmounted to expand into the enterprise.

This packaged system provides everything to manage the connection of a 16-user, structured wiring environment. The options only need to be snapped together and mounted on the wall, in a rack, or on a desktop, and then the building wiring connected using insulation displacement connection (IDC) connectors in the patch panel.

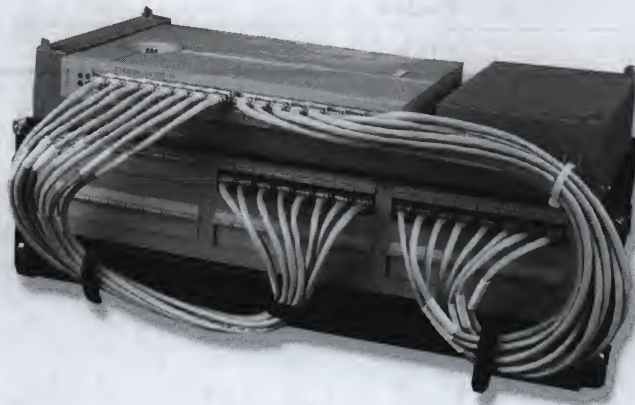


Figure 2-4: MultiStack Rack Pack



**Table 2-4: MultiStack RackPack (DETML-P\*) Materials List (Basic package with active product)**

DIGITAL Part Number	Quantity	Description
DETML-S*	1	DECrepeater 90T-16 stackable unit
H3117-LA	2	Snap-in 8-position 110 (IDC) punchdown to 8-pin modular jack patch panel connector insert supporting TIA/EIA-568A (T568A) wiring
BN25G-0E	16	UTP 8-pin to 8-pin MP Category 5 interconnect cable non-crossover for use in the office and equipment room
H3108-PA	1	Modular snap-in hinged plastic panel frame and mounting assembly
H3108-HA	1	Blank patch panel insert, 5 pack
H3108-TG	1	MultiStack mounting support tray and cover
H3108-TB	1	Work surface tray, rackmount
H3109-AF	1	Cable management kit (3) Reusable cable management ties (2) KEP nuts (3) One square inch dual lock (2) L-brackets (2) Standard screws to mount 1u blank filler (8) #6 screws (1) Velcro roll, 36" length by 3/4" width (2) Shoulder screws
H3108-BE	1	Blank filler panel, 1U

**Table 2-5: Dimensions of MultiStack Components**

Dimension	Structured Wiring Kit (H3109-EA)	DIGITAL MultiStack Rack Pack DETML-Px (Figure 2-4)
Height	5.25 inches	8 inches
Width	19 inches	19 inches
Depth	9 inches	9 inches
Weight	5.15 lbs	12.15 lbs

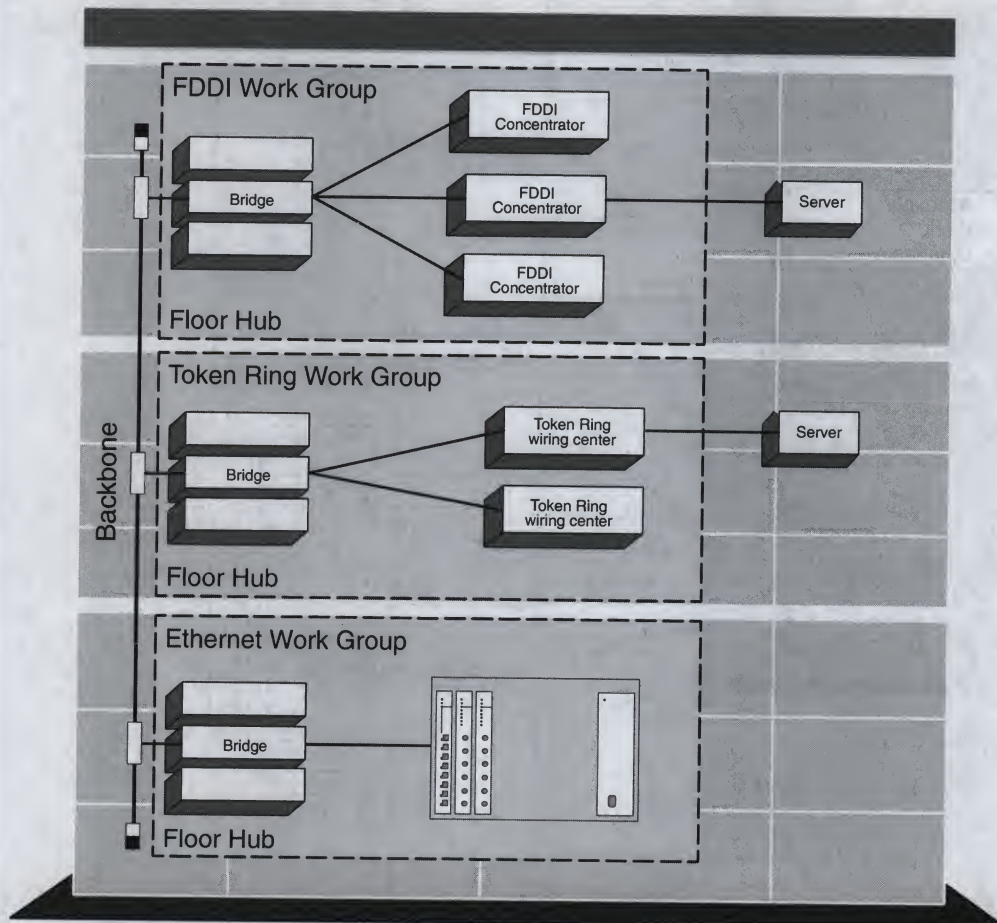


## Distributed Backbone Model

In a distributed backbone topology, all users have access to a single, shared building backbone. Often this backbone is implemented in either star radial wiring or a multidrop cable. Each floor of a building is connected to the backbone by a bridge or router. The bridge or router filters all local traffic from the backbone and forwards it to the appropriate location. The backbone may be redundant for high availability.

The distributed backbone model is used when:

- Each floor supports a high volume of local traffic
- Each floor's traffic is isolated from the backbone
- Different floors may support different LAN technologies to suit user needs
- Servers are local to work groups



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Figure 2-5: Work Group Distributed Backbone Model



## Work Group Model

A work group is defined by its physical location and network requirements, and meets the following criteria:

- Typically supported by common servers
- May include representatives of different work functions
- Has multiple media type requirements
- Requires access to common resources

The DIGITAL MultiSwitch 900 (formerly called DEHub 900 MultiSwitch) supports this topology by providing multiple LAN channels through the backplane. The MultiSwitch 900 provides flexible channels that can be configured as Ethernet, Token Ring, FDDI, or ATM. The work groups can be homogeneous or heterogeneous.

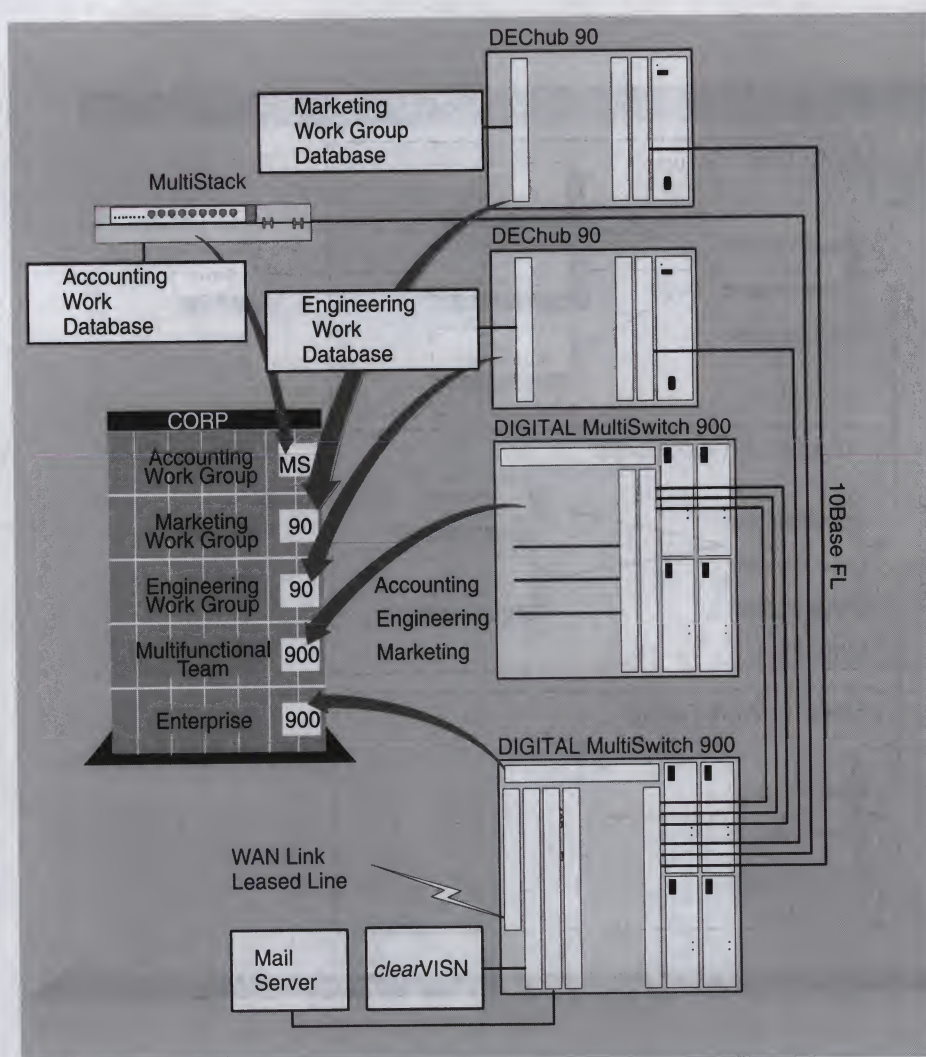


Figure 2-6: Work Group Model

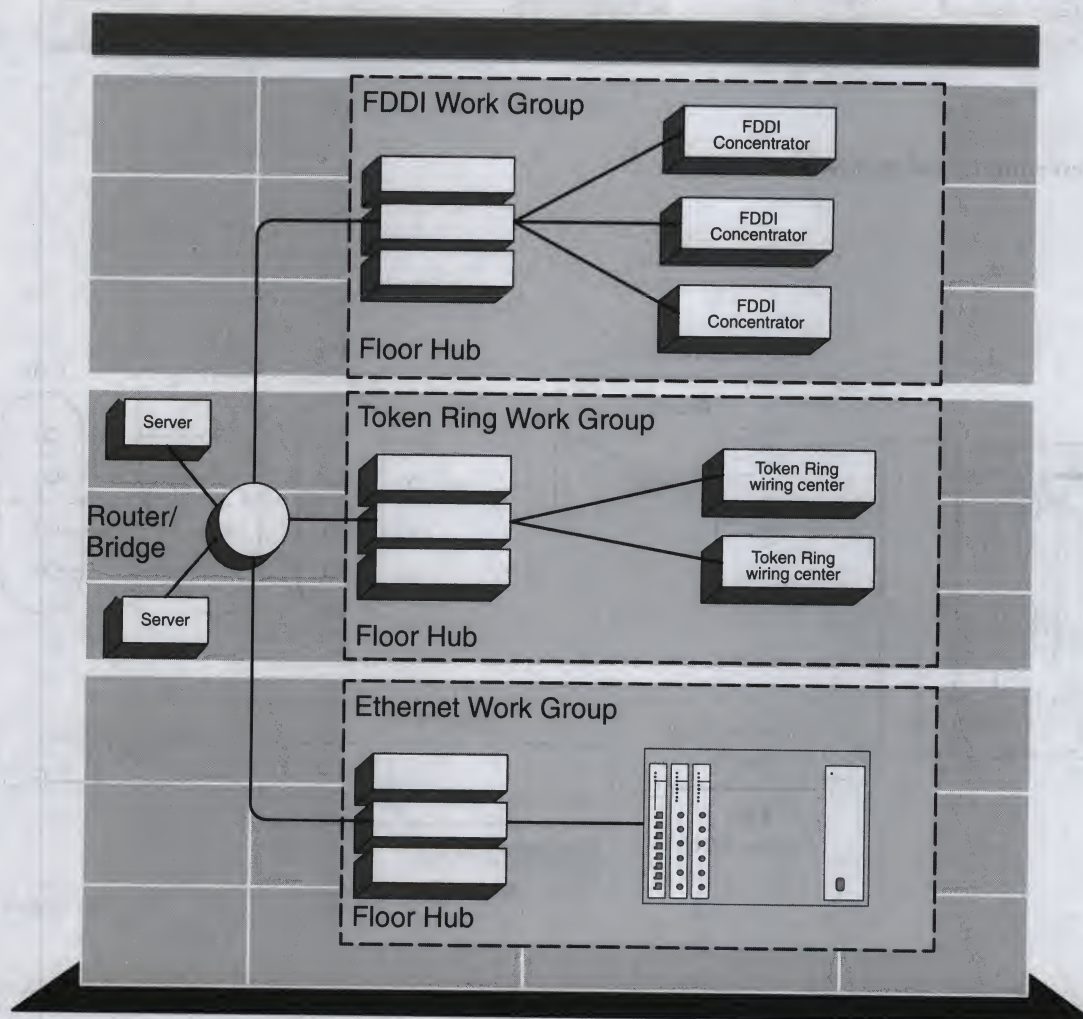


### Collapsed Backbone Model

In a collapsed backbone, each floor hub or floor network device directly connects to a central router/bridge, which serves as the building's backbone. In other words, the backplane of the router/bridge becomes the building backbone. The router/bridge services all of the building traffic.

The collapsed backbone model is used to:

- Minimize the number of router/bridge hops between users and between users and servers
- Minimize the number of bridges used in the network to minimize equipment cost
- Provide higher bandwidth connections to centralized servers
- Provide a higher bandwidth backbone



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Figure 2-7: Collapsed Backbone Model



## Interconnect Implementation

Interconnect and Full Cross-Connect are two methods used to attach the Equipment Room active device to the passive network. The direct Interconnect method shown in Figure 2-8 is the most widely used and least expensive. This method uses only one patch panel for the office termination point, and only one patch cable to connect it to the active port of the active device. When a move is needed, the patch cable on the active device is moved to another port.

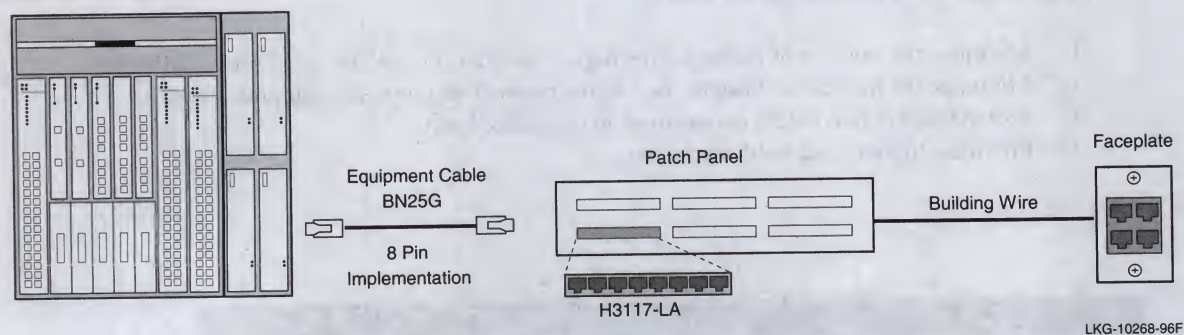


Figure 2-8: Interconnect Implementation

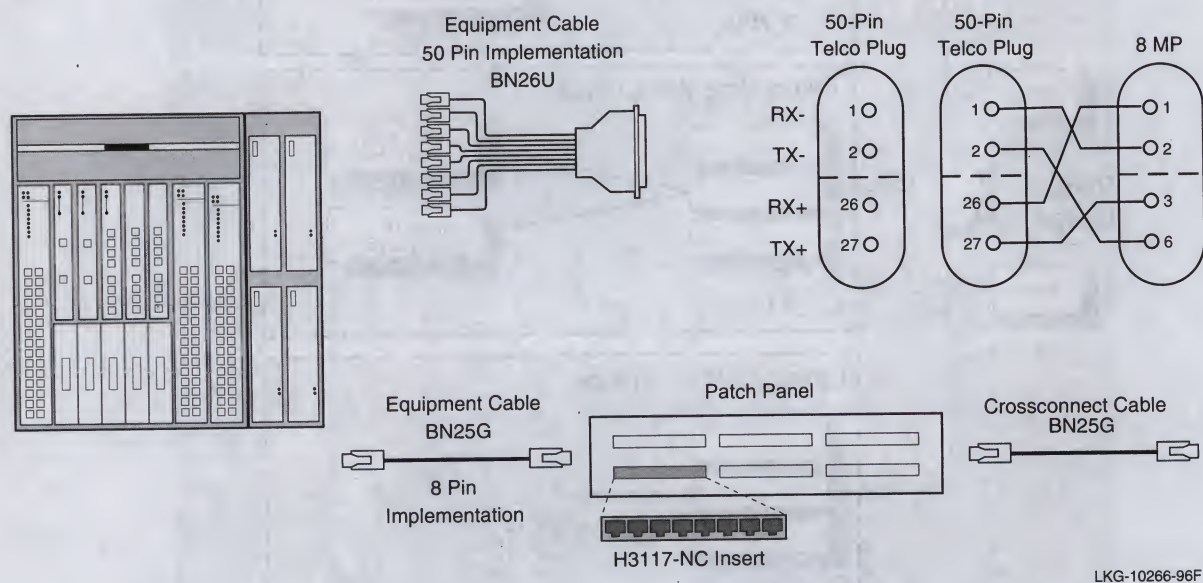
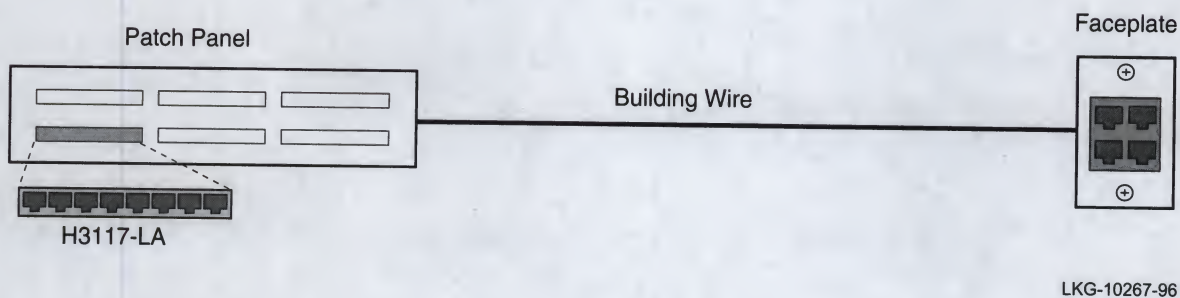


Figure 2-9: Full Cross-Connect Implementation



## Full Cross-Connect Implementation

When the Full Cross-Connect method is used, two patch panels and two cables must be used. The first patch panel assembly is used to terminate the office connection and the second patch panel is used to attach the active equipment. Patching is accomplished by using the patch cable between the patch panel assemblies. See Figure 2-9. When a move is made, the patch cable is moved, not the connection to the active device. The Cross-Connect can be implemented using either a mass terminated cable connection or a single cable. Both methods and the components necessary are shown in Figure 2-9.





## OPEN DECconnect Components Support EIA/TIA Standards

The OPEN DECconnect Structured Wiring System supplies a full series of passive components that fit into the TIA/EIA 568 standard architecture. This architecture defines the five individual wiring subsystems, campus backbone, building backbone, horizontal, work area, and administration. DIGITAL has designed and tested a system of components that physically complement these subsystems and meets the standard's technical requirements. The following three figures show some of the key OPEN DECconnect passive components and how they have been implemented within the Structured Wiring System.

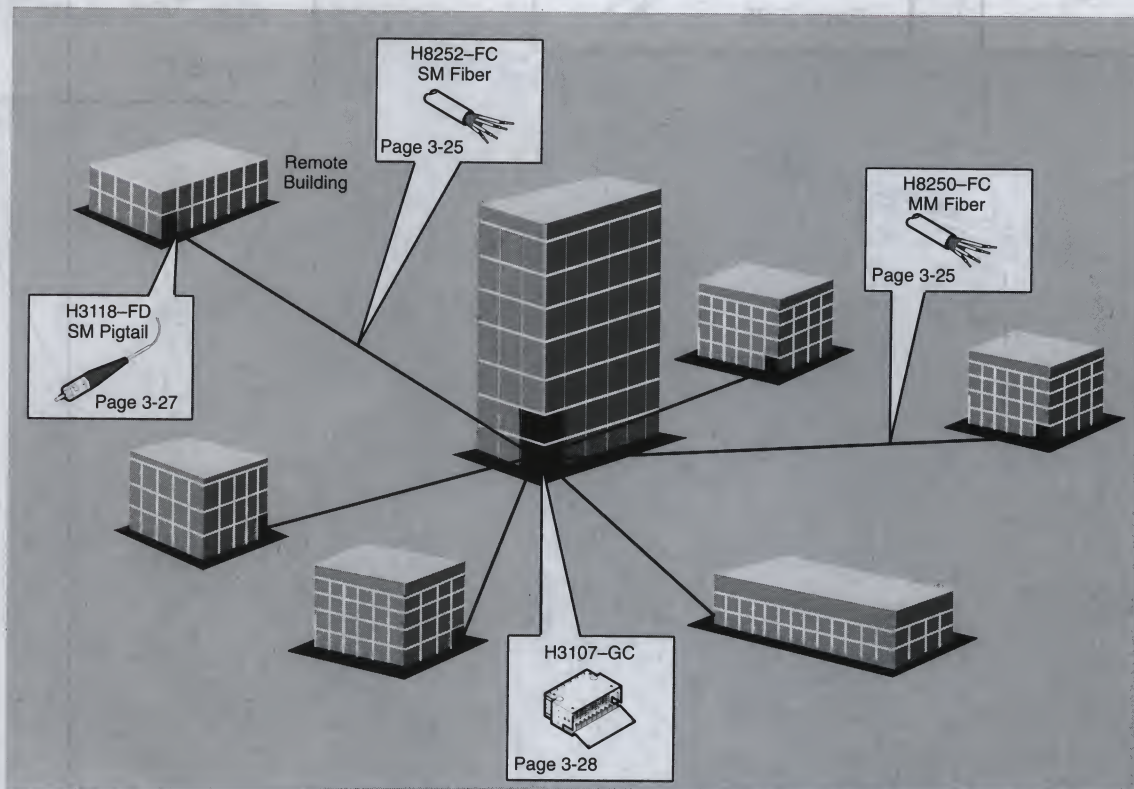
Figure 2-10 shows the campus backbone subsystem and some of the key interconnecting components.

Figure 2-11 illustrates the horizontal and work area and building backbone subsystems and some of the passive components used within those areas.

Figure 2-12 illustrates the horizontal and work area subsystems and some of the passive components used within those wiring subsystems.







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Figure 2-10: Campus Subsystem



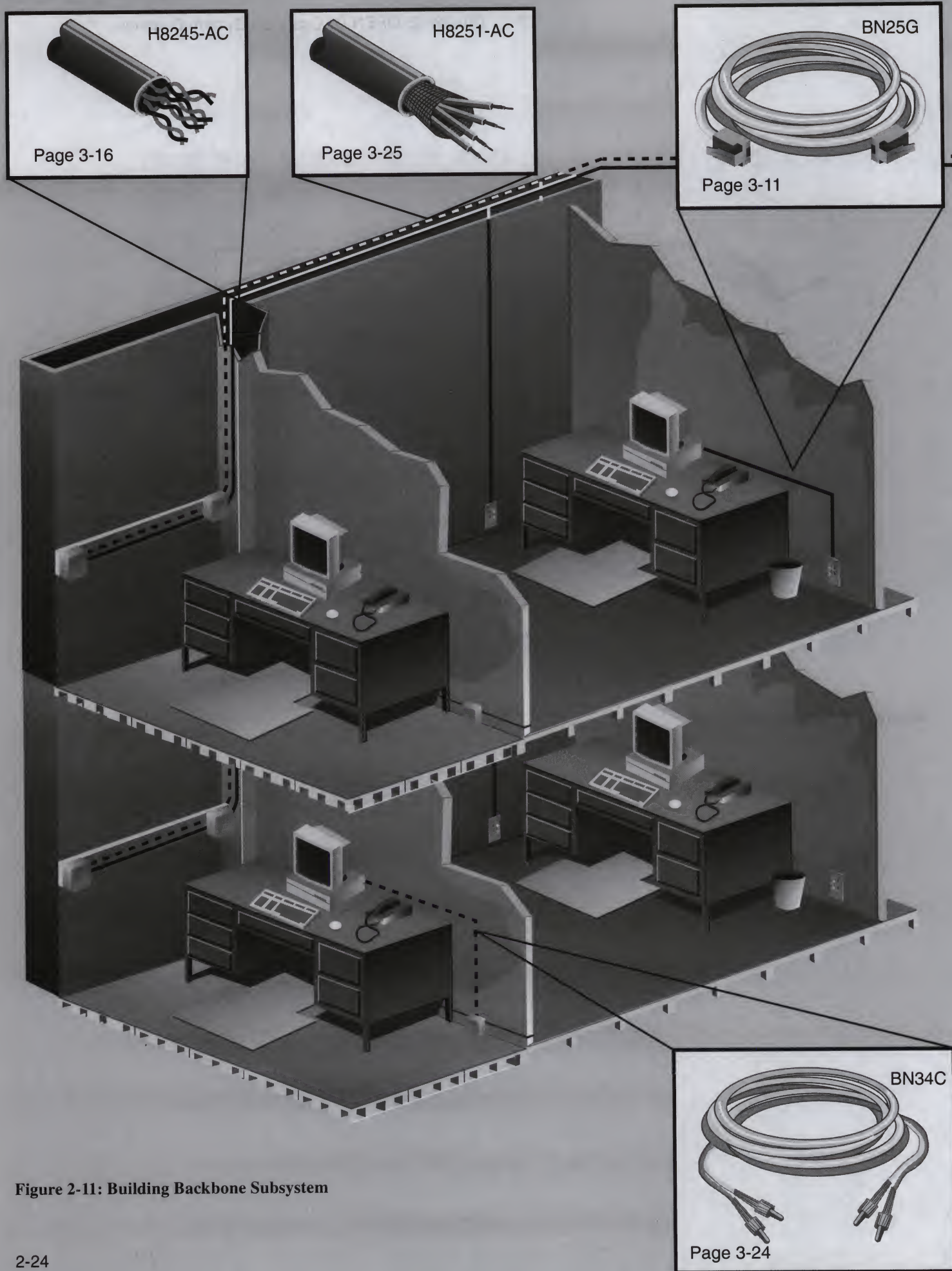
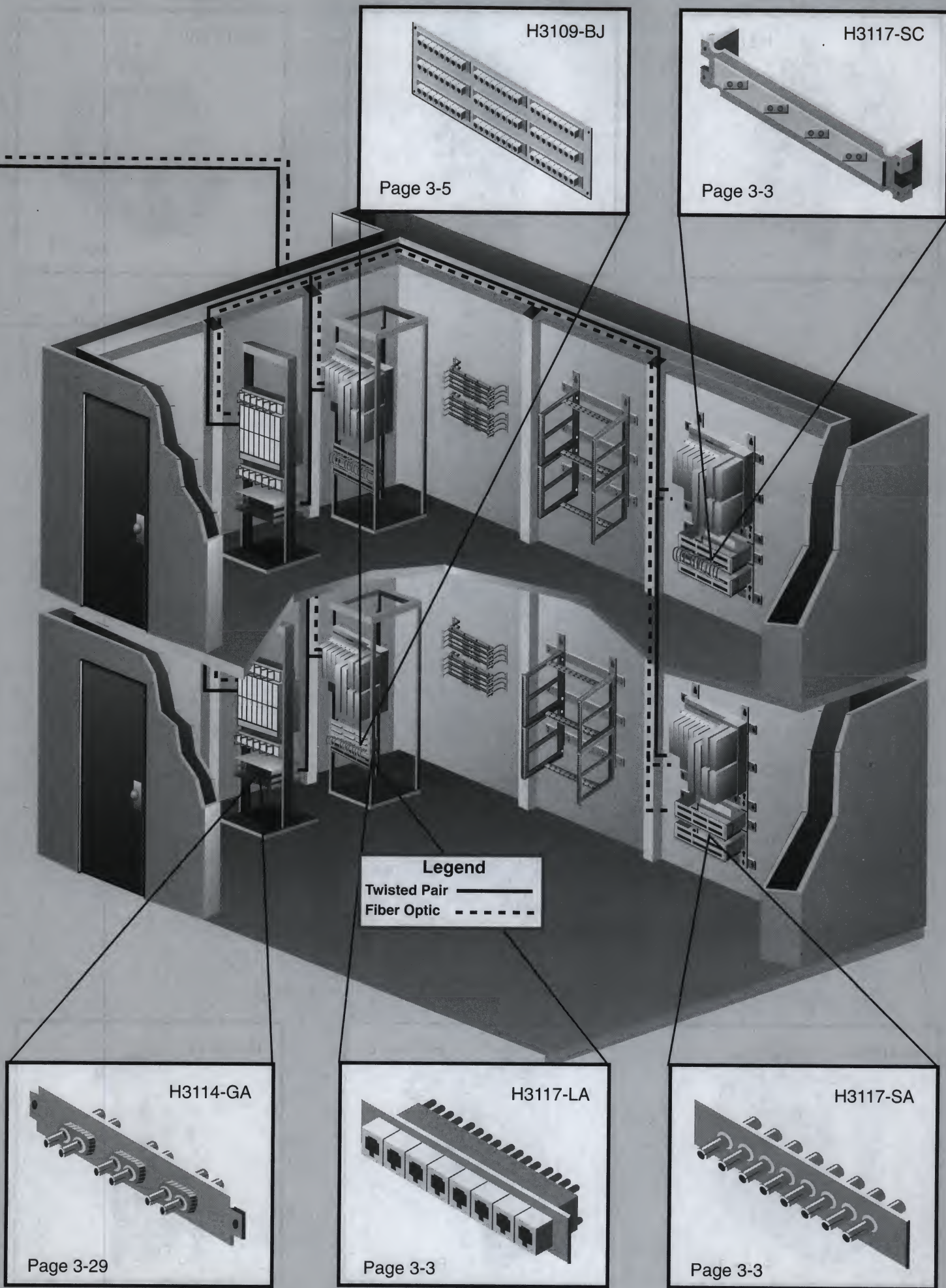


Figure 2-11: Building Backbone Subsystem







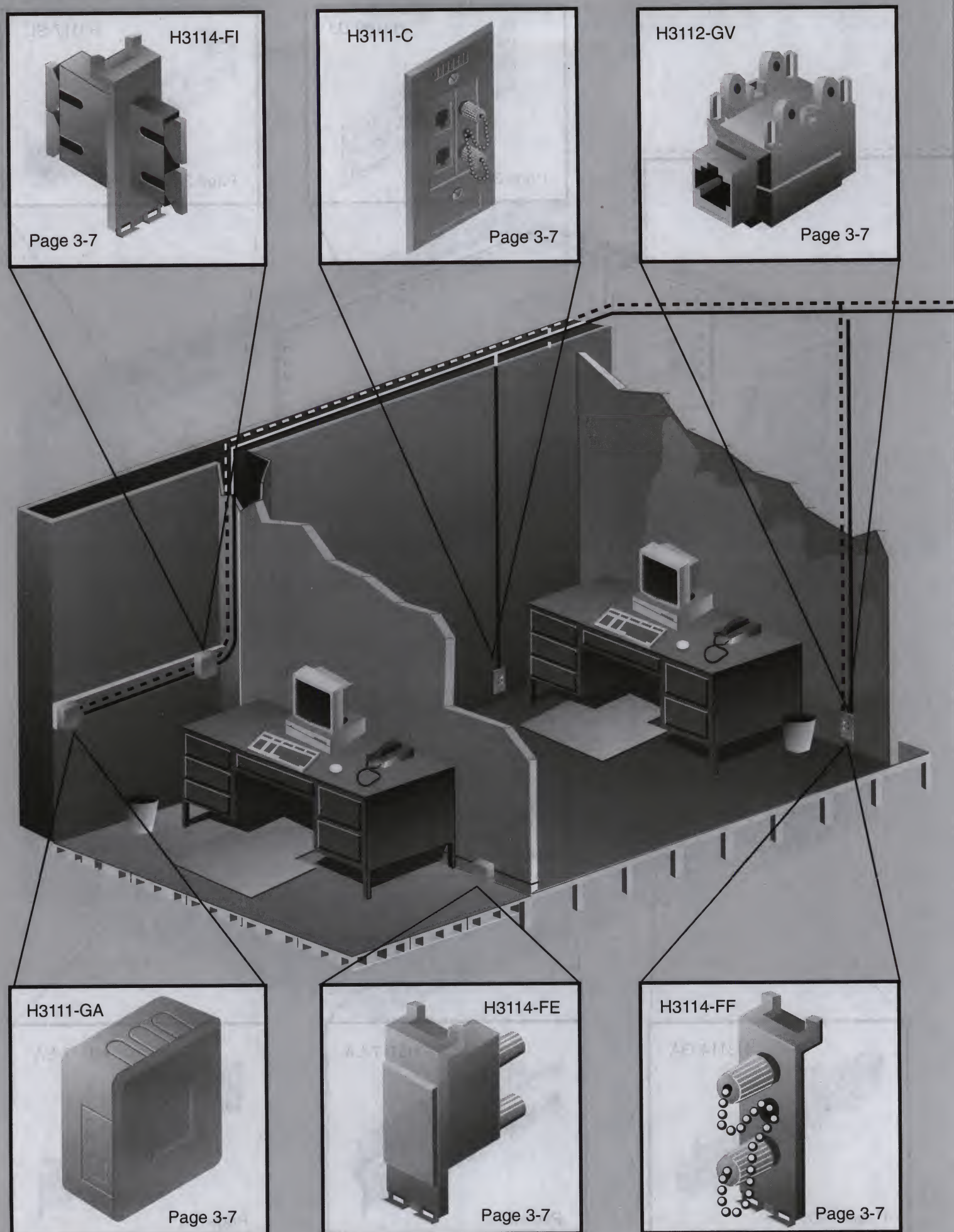


Figure 2-12: Horizontal and Work Area Subsystem

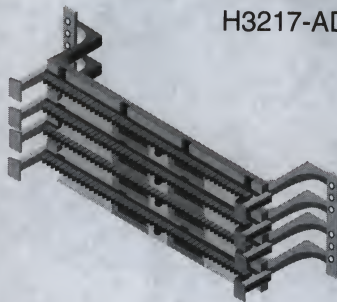


H3107-GA



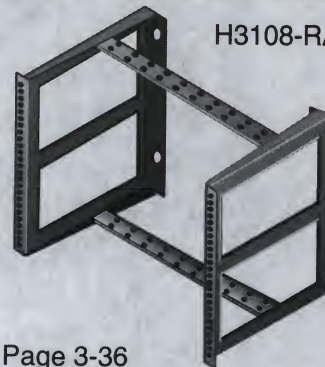
Page 3-27

H3217-AD

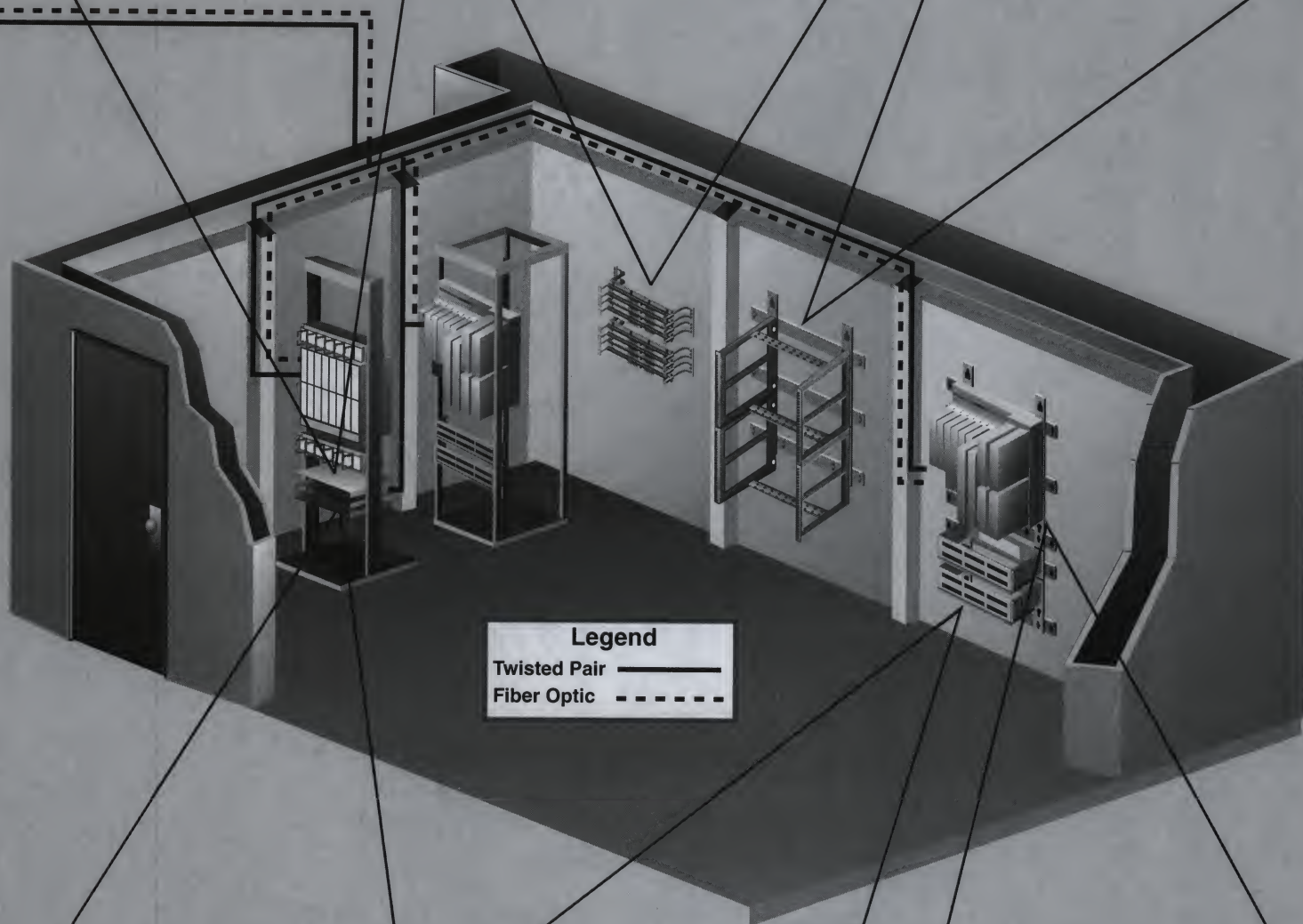


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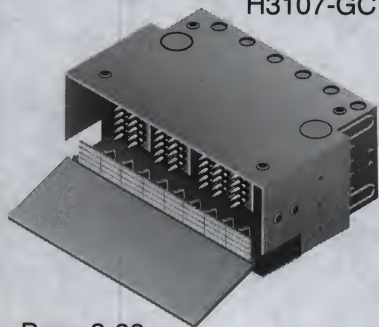
H3108-RA



Page 3-36

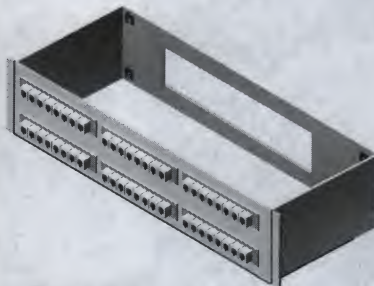


H3107-GC



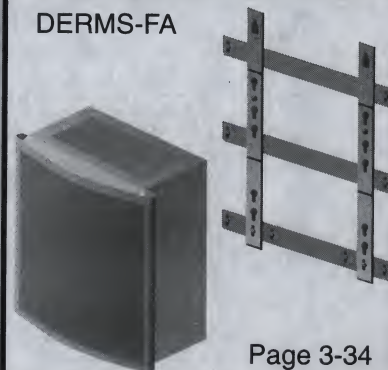
Page 3-28

H3109-BC



Page 3-2

DERMS-FA



Page 3-34







## OPEN DECconnect System Components

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The OPEN DECconnect Structured Wiring System provides passive network products that are tested and implemented as an integrated system solution. The passive building wiring components provide the transmission path between computers, network devices, workstations, and personal computers.

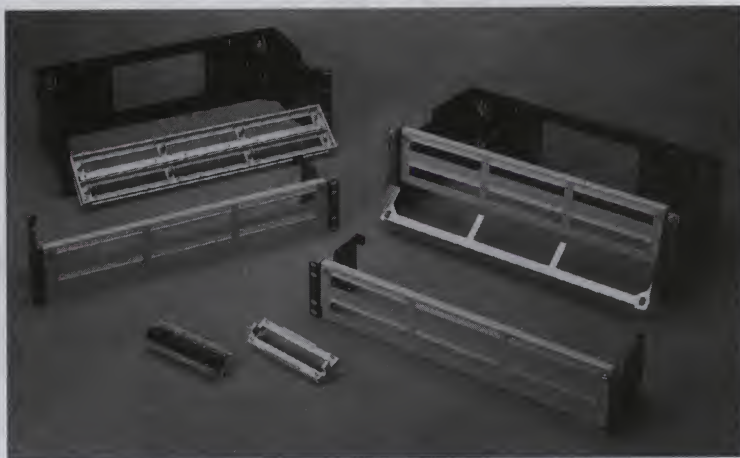
OPEN DECconnect cabling and connecting hardware comply with TIA/EIA component specifications, EIA building wiring standards, and the international ISO/IEC standards for connecting information technology equipment.

The products listed in this guide are:

- outlets
- building wiring cables
- connectors
- tools
- distribution frame components
- office cables
- equipment room cables
- adapters



## OPEN DECconnect Hinged Patch Panels



OPEN DECconnect features a complete line of patch panels that fit a wide range of applications and functional environments. See Figure 3-1. The patch panels are available in plastic and metal versions, and are hinged for easy rear access during and after installation. The family of hinged panels is specifically designed to be either rackmounted, wallmounted, or integrated with the Modular Mounting System (DERMS). (For additional information on mounting systems, see Mechanical Assemblies on page 3-34.) The metal panels can be ordered preconfigured with DIGITAL's Super-5 series of modules or unloaded for custom configurations. The Super-5 series of modules are designed for high-performance, 100-MHz data channels, optimized when combined with the other Super-5 link components. The panels are designed for flush- and recessed-mounting, provide 48-port density, and feature color-coded labels. See Tables 3-1 through 3-3 for ordering information.

**Figure 3-1: Hinged Patch Panels**

### Features

- Hinged for easy rear access
- Optional color-coding strips for plastic panels
- Available loaded with TIA/EIA-T568A Category 5 modules
- Rackmount, wallmount, or modular mounting
- Loaded versions available
- Removable modules
- Flush or recessed panel mounting

**Table 3-1: Hinged Patch Panels Ordering Information**

Part Number	#Ports	Wiring	Dimensions /Description
H3109-BB	48	T568A	3.5" (8.9 cm) x 19" (48.3 cm) x 4" (10.2 cm) /Metal, rackmount, preloaded w/ H3117-LA, 2U
H3109-BC	48	T568A	3.5" (8.9 cm) x 19" (48.3 cm) x 9" (22.9 cm) /Metal, wallmount, preloaded w/ H3117-LA, 3U
H3108-BB	48	N/A	3.5" (8.9 cm) x 19" (48.3 cm) x 4" (10.2 cm) /Metal panel, rackmount, 2U
H3108-BC	48	N/A	3.5" (8.9 cm) x 19" (48.3 cm) x 9" (22.9 cm) /Metal panel, wallmount, 3U
H3108-PA	48	N/A	3.5" (8.9 cm) x 19" (48.3 cm) x 9" (22.9 cm) /Plastic panel, wallmount, 3U
H3108-PB	48	N/A	3.5" (8.9 cm) x 19" (48.3 cm) x 4" (10.2 cm) /Plastic panel, rackmount, 2U

NEW

NEW



Table 3-2: Patch Panel Insert Modules

Part Number	#Ports	Wiring	Description
H3117-LA	8	T568A	UTP, 110-8MJ, Category 5
H3117-LC	8	T568B	UTP, 110-8MJ, Category 5
H3117-LB	8	T568A	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-LD	8	T568B	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-LE	8	T568A	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-LF	8	T568B	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-NC	8	N/A	UTP, 8MJ-8MJ, Category 5
H3117-NB	8	N/A	ScTP (FTP), 8MJ-8MJ, Category 3 (Screened/Foiled twisted-pair)
H3117-MA	8	N/A	UTP, 50-pin-8MJ, Category 3
H3117-SA	8	Fiber	8 ST multimode fiber-optic couplers
H3117-SC	8	Fiber	4-dual SC multimode fiber-optic couplers — beige couplers
H3117-SD	8	Fiber	4-dual SC single mode fiber-optic couplers — blue couplers
H3117-PA	8	ThinWire	8 BNC coax couplers



Figure 3-2: H3117-LA



Figure 3-3: H3108-PB with color strips

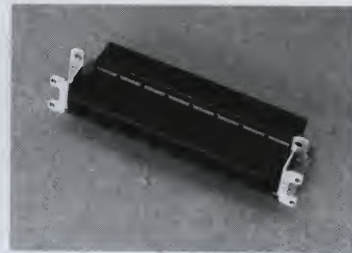


Figure 3-4: H3117-NC

Table 3-3: Options

Part Number	Description
H3109-AC	Rackmounting hardware (20 screws and U-nuts for four panels)
H3117-HA	Patch panel filler blanks
H3108-KA	Grey color coding kits for H3108-PA/PB patching system
H3108-KD	Blue color coding kits for H3108-PA/PB patching system
H3108-KE	Green color coding kits for H3108-PA/PB patching system
H3108-KF	Yellow color coding kits for H3108-PA/PB patching system
H3117-UB	Compatibility brackets for metal patch panels and H3117-LA/LC/LE/LF/MA modules
H3108-TA	Work surface tray, sliding for H3108-IA bracket
H3108-TB	Work surface for rackmounted patch panels (use H3108-TH Hardware Mounting Kit)



## OPEN DECconnect Category 5 Metal Patch Panels



Figure 3-5: Flush Mount Patch Panel

A traditional lower cost line of rackmount metal patch panels is provided in three configurations. The basic mounting frames provide connections for 24-, 48-, and 72-user connections. See Figure 3-5. These patch panels are designed for flush mounting in standard equipment racks or used with the Modular Mounting System rack option (see Mechanical Assemblies on page 3-34). The panels come preconfigured (H3109 series) with DIGITAL's Super-5 (Category 5) unshielded twisted-pair (UTP) patch panel modules or may be ordered unloaded (H3108 series) for custom configurations. Like the hinged panels, these panels accept all of the OPEN DECconnect patch panel insert modules, allowing total media flexibility. The panels include color-coded identification labels and accept an optional cable strain relief bar. See Tables 3-4 and 3-5 for ordering information.

### Features

- Loaded and unloaded panels
- 110 IDC terminations
- Color-coding labels included
- Rackmount or modular mounting
- Optional cable strain relief bar
- Flush mount

### Tips — Patch Panels

- All metal panels, hinged and flush, require compatibility brackets (H3117-UB) when mounting the H3117-LA/LC/LE/LF and H3117-MA UTP modules
- The 24- and 48-port flush mount panels use one strain relief bar
- The 72-port flush mount panels use two strain relief bars
- Mounting hardware is required for all metal rackmount panels



Table 3-4: Flush Mount Patch Panels Ordering Information









Part Number	#Ports	Wiring	Dimensions/Description
 H3109-BD	24	T568A	1 3/4" (4.5 cm) /1U rackmount, 19" (48.3 cm) preloaded w/ H3117-LA
 H3109-BH	48	T568A	3 1/2" (8.9 cm) /2U rackmount, 19" (48.3 cm) preloaded w/ H3117-LA
 H3109-BJ	72	T568A	5 1/4" (13.2 cm) /3U rackmount, 19" (48.3 cm) preloaded w/ H3117-LA
 H3108-BD	24	NA	1 3/4" (4.5 cm) /1U rackmount, 19" (48.3 cm) unloaded
 H3108-BH	48	NA	3 1/2" (8.9 cm) /2U rackmount, 19" (48.3 cm) unloaded
 H3108-BJ	72	NA	5 1/4" (13.2 cm) /3U rackmount, 19" (48.3 cm) unloaded

Table 3-5: Options for Flush-Mount Patch Panels

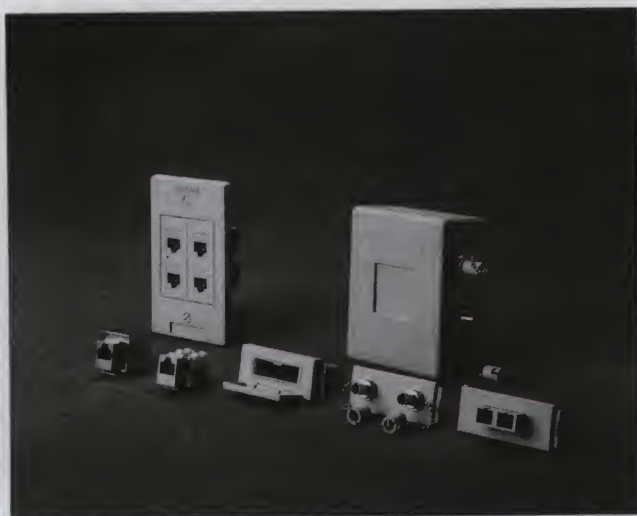
Part Number	Description
 H3108-BK	Strain relief bar
 H3109-AC	Rackmounting hardware (20 screws and U-nuts for four panels)
H3117-UB	Compatibility brackets for metal patch panels and H3117-LA/LC/LE/LF/MA modules

## H3109-BD Category 5 Patch Panel





## OPEN DECconnect Modular Faceplates, Wallboxes, and Connectors



DIGITAL's patented modular faceplate and wallbox system provides easy-mount, snap-in installation for all media types. The system of faceplate and surface mount wallboxes allows the flexibility and density required in today's mixed media environments. The H3111-C faceplate system accommodates up to four communications connections: any combination of modular UTP jacks (MJs) for both Category 5 and Category 3 for voice and data communications, ST bayonet, SC-type and FDDI MIC fiber connectors, BNC connectors for ThinWire Ethernet, and F-style video. All faceplate and wallbox connectors snap in directly and do not require tools for installation. Blank inserts are provided for unused portions of the faceplate. The H3111 type modular wallboxes are wall-mountable receptacles that accept all standard faceplate inserts, including fiber-optic inserts. See Tables 3-6 and 3-7 for ordering information.

Figure 3-6: Modular Faceplates, Wallboxes, and Connectors

### Features

- Snap-in modules
- Supports data, voice, and video
- Blank inserts provided
- No tools required
- Supports all media types
- Kits include all required installation hardware

### Tips — Faceplates and Wallboxes

- Faceplate kits include two dual connector inserts, one dual blank, one single blank, screws, and label (packed eight kits per box)
- Wallboxes include two dual connector inserts, two dual blanks, one single blank, five cable rings, mounting plate, Velcro strips, and screws (packed eight kits per box)
- When using fiber optics, the faceplate should be installed with a box allowing proper radial bends into the connectors
- Wallboxes include fiber-optic cable management components and is preferred for fiber installations if space allows



**Table 3-6: Faceplates and Wallboxes Ordering Information**

Part Number	Description
H3111-C	(8) Faceplates with inserts, gray
H3111-GA	(8) Modular wallbox, surface mount, gray
H3111-GB	(8) Modular wallbox, surface mount, white
H3111-GC	(8) Modular wallbox, surface mount, ivory

**Table 3-7: Faceplates and Wallboxes Options**

Part Number	Description
H3112-GV	(8) UTP MJ-110, T568A, Super-5 (Category 5)
H3112-HV	(8) ScTP, MJ-110, T568A, Super-5 (Category 5) (Screened/Foiled twisted-pair)
H3112-IV	(8) UTP, MJ-110, T568B, Super-5 (Category 5)
H3112-JV	(8) ScTP, MJ-110, T568B, Super-5 (Category 5) (Screened/Foiled twisted-pair)
H3114-FE	(8) FDDI connector kit snap-in
H3114-FF	(8) Dual ST bayonet couplers, snap-in
H3114-FI	Dual SC/SC fiber-optic coupler
H3112-A	(8) AT&T style jack for phone
H3112-B	(8) NORTEL style jack for phone
H3112-D	(8) Universal phone jack
H3112-E	(8) 8-pin MJ data jack without icon (Category 3)
H3112-F	(8) 8-pin MJ data jack with icon (Category 3)
H3112-G	(8) 8-pin MJ jack with 110 punchdown (Category 3)
H3113-A	(8) UTP data jack 6-pin MMJ-110 off set key



## European Faceplates

European style faceplates are available in various types and configurations to fit specific country requirements. All UTP, ScTP, BNC, and video modules will snap in. These faceplates are not available in the Americas or Asia Pacific.

**Table 3-8: Part Numbers for International Faceplates and Modules**

	Logo	White	Ivory
<b>Faceplates (mm)</b>			
86x146	DIGITAL None Custom	E0-H3111-FK E0-H3111-NB E0-H3111-SB	
86x86	DIGITAL None Custom	E0-H3111-EK E0-H3111-NA E0-H3111-SA	
80x80 square corners	DIGITAL None Custom	E0-H3111-EF E0-H3111-NC E0-H3111-SC	E0-H3111-DD E0-H3111-ND E0-H3111-SD
80x80 square, ganged, pair of ends	DIGITAL None Custom	E0-H3111-FF E0-H3111-NJ E0-H3111-SJ	E0-H3111-DK E0-H3111-NK E0-H3111-SK
Center extension	None	E0-H3111-FW	E0-H3111-FI
Riser ring, square	None	E0-H3111-GW	E0-H3111-GI
80x80, rounded corners	DIGITAL None Custom	E0-H3111-ED E0-H3111-NF E0-H3111-SF	E0-H3111-DG E0-H3111-NG E0-H3111-SG
80x80, rounded, ganged, pair of ends	DIGITAL None Custom	E0-H3111-FD E0-H3111-NN E0-H3111-SN	E0-H3111-DO E0-H3111-NO E0-H3111-SO
Center extension	None	E0-H3111-IW	E0-H3111-II
Riser ring, rounded	None	E0-H3111-RW	E0-H3111-RI
floorbox frame	None	E0-H3111-RF	
<b>Blank Modules (mm)</b>			
50 (double)		E0-H3111-DW	E0-H3111-DI
25 (single)		E0-H3111-SW	E0-H3111-SI
12.5 (half)		E0-H3111-HW	E0-H3111-HI
<b>Connector Modules (mm)</b>			
Unshuttered		E0-H3111-E1	E0-H3111-E2
Shuttered		E0-H3111-E3	E0-H3111-E4
British Telecom		E0-H3111-E8	



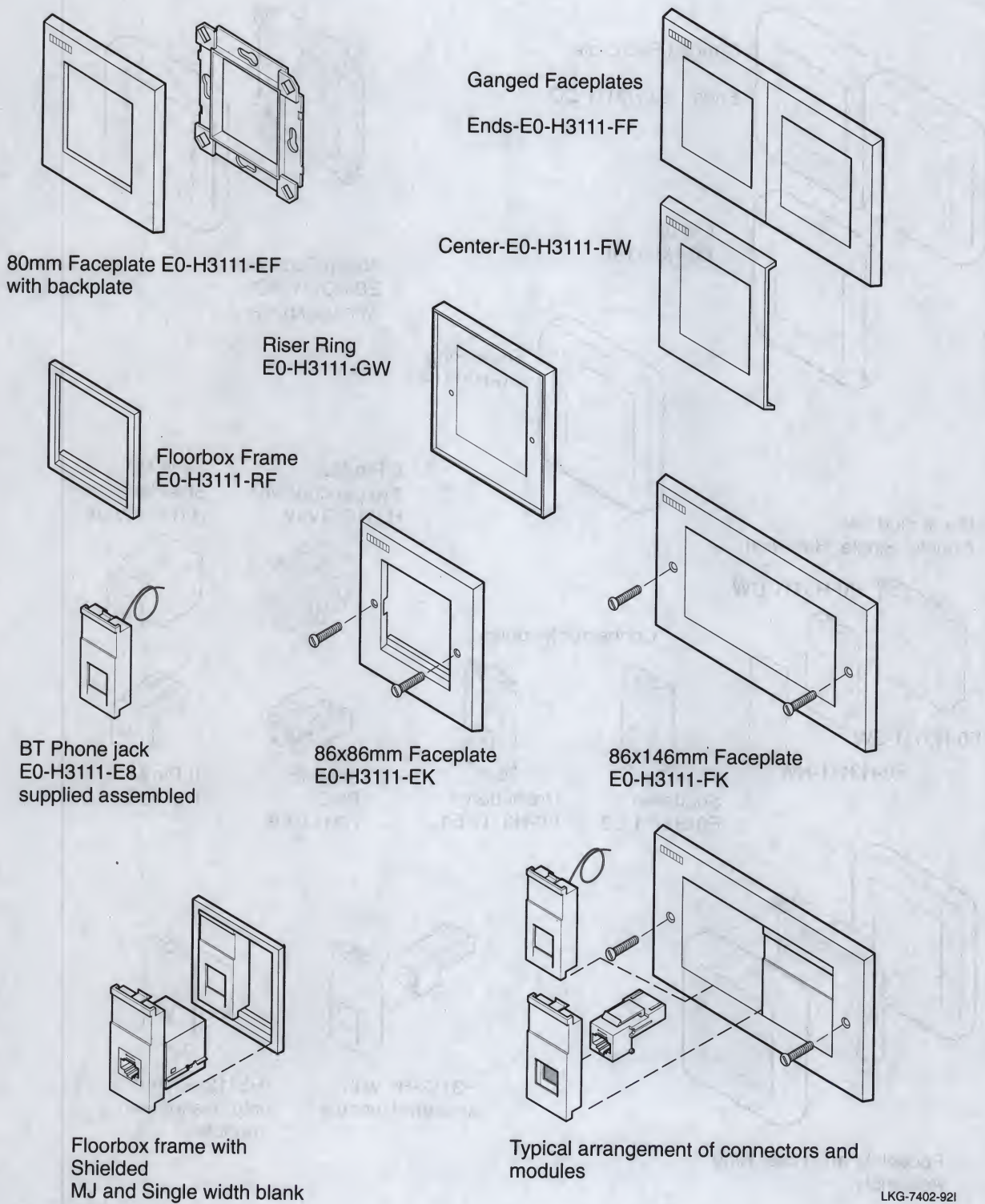
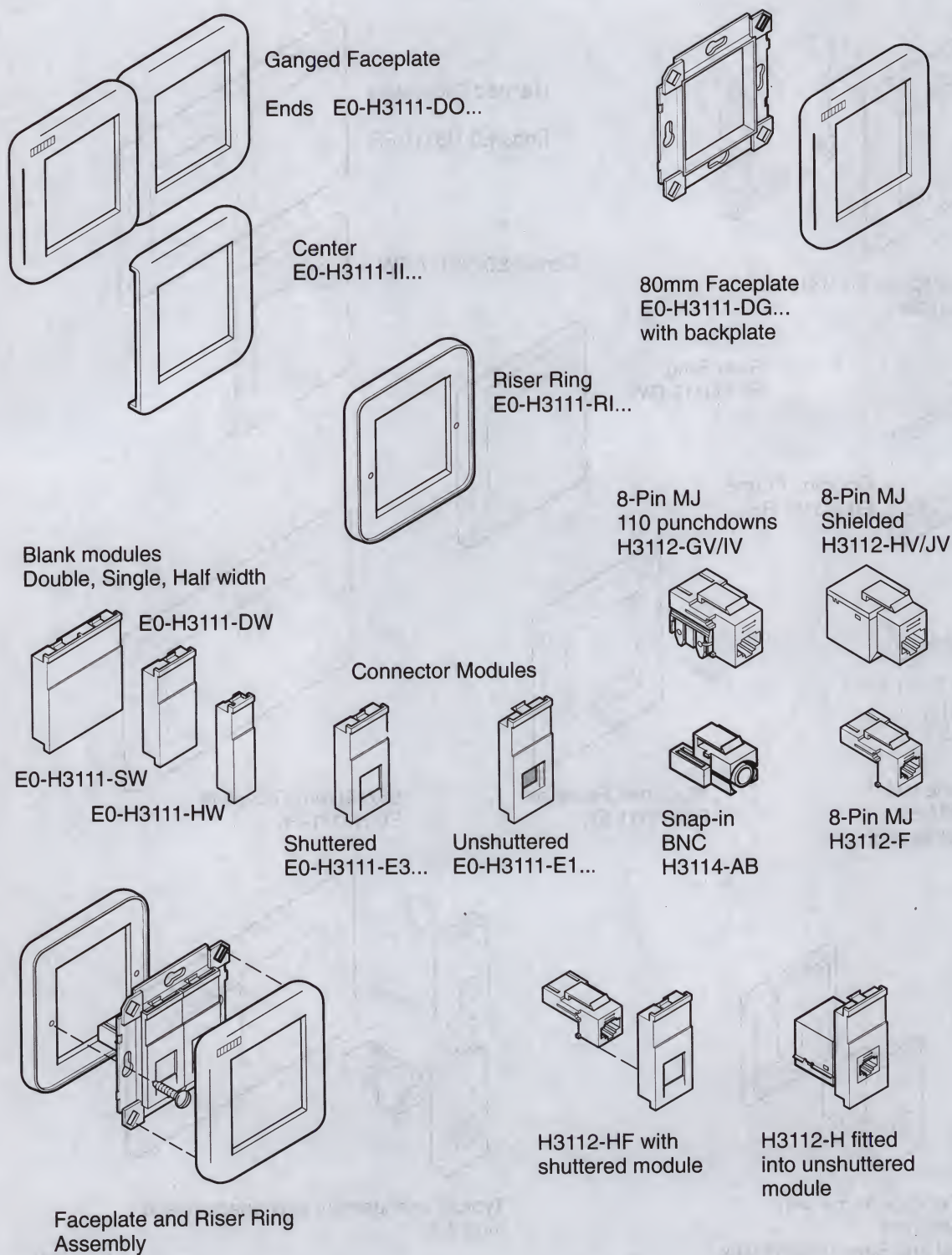


Figure 3-7: International Faceplates and Components





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Figure 3-8: International Faceplates and Components



## UTP Patch Cables/Office Cables

The OPEN DECconnect system provides a series of 8-pin MPs, 6-pin MMPs, and 110 cable assemblies for UTP and ScTP Category 5 and Category 3 implementations. See Figure 3-9.

DIGITAL's high-performance modular patch cables operate efficiently with our Super-5 patch panels and faceplate inserts, providing enhanced Category 5 channel performance. All modular plug (MP) connectors are gold plated to provide excellent long-term performance. Cables are supplied in standard lengths. See Table 3-9 for ordering information.

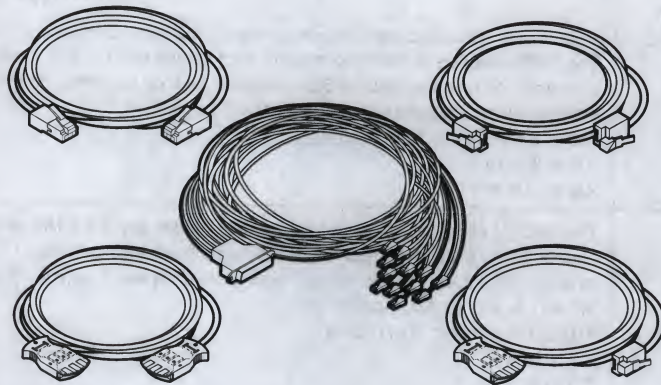


Figure 3-9: Family of Patch Cables and Office Cables

### Features

- 24 AWG Category 5 stranded cable
- Extended performance characteristics
- Modular plugs are 50-micron gold plated
- Category 5 and Category 3 cables
- 110-to-110 and 110-to-MP Category 5 cables

Table 3-9: UTP Patch Cables and Office Cables Ordering Information

Part Number	Description
<b>Category 5</b>	
BN25G-0E BN25G-01 BN25G-03 BN25G-04 BN25G-07	The BN25G is a 24 AWG, four-unshielded twisted-pair, stranded TIA/EIA Category 5 cable. It is configured with standard 8-pin modular plugs, wired pin-to-pin. The BN25G can be used as an office or equipment cable. It can also be used for Token Ring, ATM, Fast Ethernet, TP-PMD, or as an ISDN office cable. See Figure A-20 on page A-11. 8-pin MP to 8-pin MP TIA/EIA Category 5 data grade equipment cable: 0.5 m (1.65 ft) 1.0 m (3.3 ft) 3.0 m (9.8 ft) 4.0 m (13.1 ft) 7.0 m (23 ft)
BN24Q-0E BN24Q-01 BN24Q-03 BN24Q-04 BN24Q-07	The BN24Q supports the UTP local connection of either 100BaseT or 10BaseT products in an office or lab area. For the pin-pair wiring diagram, see Figure A-22 on page A-12. 8-pin MP to 8-pin MP crossover office cable (DTE to DTE): 0.5 m (1.65 ft) 1.0 m (3.3 ft) 3.0 m (9.8 ft) 4.0 m (13.1 ft) 7.0 m (23 ft)
BN25H-03	The BN25H is a 100-ohm Category 5 office cable that supports copper <b>FDDI (TP-PMD) devices</b> in an office environment (DTE to DTE). This cable connects either two FDDI devices directly or an FDDI interface card such as the FDDIcontroller/EISA UTP to an office faceplate. For the pin-pair wiring diagram, see Figure A-11 on page A-10. 8-pin MP to 8-pin MP office cable (crossover): 3.0 m (9.8 ft) 8-pin MP to 8-pin MP office cable (crossover): 3.0 m (9.8 ft)



**Table 3-9: UTP Patch Cables and Office Cables Ordering Information**

Part Number	Description
BN25U-01 BN25U-02 BN25U-03	The BN25U series of patching/interconnect cables are TIA/EIA Category 5 compliant. This cable has a 110 IDC modular connector on one end and an 8-pin modular jack on the other. There are 10 individual cables in each BN25U kit. For the pin-pair wiring diagram see Figure A-16 on page A-10. 110 to 8 MP cable, 1.0 m (3.3 ft) 2.0 m (6.6 ft) 3.0 m (9.8 ft)
BN25V-01 BN25V-02 BN25V-03	The BN25V series of patching/interconnect cables are TIA/EIA Category 5 compliant. This cable has a 110 IDC modular connector on each end. This cable is designed to patch between 110 IDC termination fields. There are 10 individual cables in each BN25V kit. For the pin-pair wiring diagram see Figure A-17 on page A-10. The BN25V series can be ordered in either 1.0, 2.0, or 3.0 meter lengths. 110 to 110 cable, 1.0 m (3.3 ft) 2.0 m (6.6 ft) 3.0 m (9.8 ft)
H8240-A*	The H8240-A is a TIA/EIA Category 5, high-performance, data grade, 4-pair 100-ohm stranded UTP cable. The H8240-A is used to make custom office cables for applications that require high-speed data transmission. 1,000-ft (305-m) reel unshielded twisted-pair (UTP) Category 5, stranded cable, 4-pair 100-ohm.
<b>Category 3</b>	
BC16E-02 BC16E-10 BC16E-25 BC16E-50 BC16E-A0	The BC16E, an unshielded 6-conductor flat cable, is a terminal and printer connection cable. It is terminated at both ends with 6-pin modified modular plugs that have offset keys to prevent their being accidentally plugged into a phone jack. The BC16E has six stranded conductors and is configured as a null-modem cable. For the pin-pair wiring diagram, see Figure A-19 on page A-11. 6-pin MMP to 6-pin MMP terminal interconnection cables: 2 ft (0.6 m) 10 ft (3.1 m) 25 ft (7.6 m) 50 ft (15.2 m) 100 ft (30.5 m)
BC16U-10	The BC16U connects a 10BaseT device to pre-TIA/EIA 568 OPEN DECconnect wiring terminated with H3113-type 6-pin modified jacks, at the faceplate and in the wiring closet. For the pin-pair wiring diagram, see Figure A-18 on page A-11. 6-pin MMP to 8-pin MP cable assembly: 10 ft (3.1 m)
BN24J-01 BN24J-03 BN24J-07	The BN24J connects the 6-pin MMJ port of a EIA-423 compliant server to the 8-pin MJ patch panel insert jack. The BN24J is a three-twisted-pair cable configured with one 6-pin modified modular plug and one standard 8-pin modular plug. For the pin-pair wiring diagram, see Figure A-21 on page A-11. 6-pin MMP to 8-pin MP equipment cable: 1.0 m (3.3 ft) 3.0 m (9.8 ft) 7.0 m (23 ft)
BN24H-03 BN24H-04 BN24H-07	The BN24H connects the 6-pin MMJ port of a terminal or printer to the 8-pin MJ faceplate data connector. The BN24H is a three-twisted-pair cable configured with one 6-pin modified modular plug, one standard 8-pin modular plug with crossover wiring. For the pin-pair wiring diagram, see Figure A-15 on page A-10. 6-pin MMP to 8-pin MP office cable (crossover): 3.0 m (9.8 ft) 4.0 m (13.1 ft) 7.0 m (22.96 ft)
H8240-00	The H8240 cable is a 6-conductor flat terminal interconnection cable. This is used to make office terminal cables and is available in PVC only. It has six 26 AWG stranded conductors.

\*To make custom office cables only. DIGITAL does not recommend making Category 5 cable assemblies in the field.



## UTP Equipment/Device-Specific Cables

OPEN DECconnect features a complete line of equipment cables that fit a wide range of applications. Device-specific cables and adapters facilitate wiring equipment to other devices or LANs.

DIGITAL's line of UTP equipment cables provide support for 50-, 36-, 25-pin AT modem cables, 9-pin D-sub, 8-pin modular plugs, and 6-pin modified modular plugs. DIGITAL also supplies a full line of application-specific cables that interface to extended LANs and internal balun cables for impedance matching.

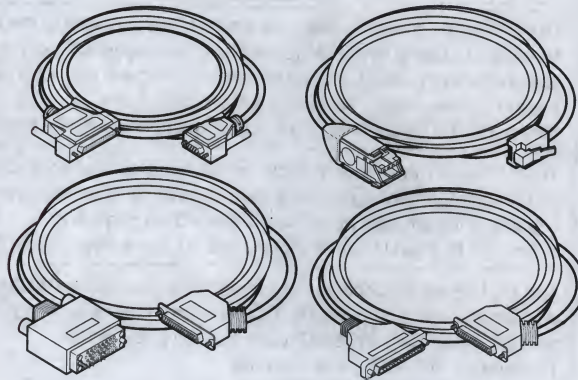


Figure 3-10: UTP Equipment Cables

### Features

- High quality equipment cables
- Standards compliant
- Full line of device-specific cables
- Wide variety of connector types and applications

Table 3-10: UTP Equipment/Device-Specific Cables Ordering Information

Part Number	Description
BNE4C-01 BNE4C-02 BNE4C-05	The BNE4C/D series office transceiver cables are available in PVC versions for use in nonenvironmental airspaces. Both a straight connector version and a right-angle connector version are available. PVC-insulated IEEE 802.3-compliant office transceiver cable with straight connector: 1.0 m (3.3 ft) 2.0 m (6.6 ft) 5.0 m (16.4 ft)
BNE4D-02 BNE4D-05	PVC-insulated IEEE 802.3-compliant office transceiver cable with right-angle connector: 2.0 m (6.6 ft) 5.0 m (16.4 ft)
BNE4G-02 BNE4G-05	The BNE4G series office transceiver cables are available in PVC versions for use in nonenvironmental airspaces. Both ends of the cable have straight connectors: the PC 15-pin connector has screw locks, the other end has bale locks. PVC-insulated IEEE 802.3-compliant office transceiver cable with straight connector: 2.0 m (6.6 ft) 5.0 m (16.4 ft)
BN24N-03	The BN24N connects the 36-pin port of the <b>DECserver 200/DL or CXA16 terminal server</b> to the 8-pin MJ ports of the H3117-NC patch panel insert. The BN24N is an octopus cable configured with eight 8-pin standard modular plugs and one 36-pin right-angle connector. For the pin-pair wiring, see Table A-4 on page A-7. 3.0 m (9.8 ft) 36-pin to eight 8-pin MP equipment cable
BN26R-03	The BN26R connects the 8-pin MJ ports of a <b>10BaseT server</b> such as the DEC repeater 90TL to the 50-pin port of the H3117-MA patch panel insert. The BN26R is an octopus cable configured with eight 8-pin modular plugs and one male 50-pin straight connector. For the pin-pair wiring, see Table A-1 on page A-2. 3.0 m (9.8 ft) 50-pin to eight 8-pin MP equipment cable
BN26U-03	The BN26U connects the 8-pin MJ ports of the <b>10BaseT DEC repeater 900GM</b> to the 50-pin port of the H3117-MA patch panel insert. The BN26U is an octopus cable configured with twelve 8-pin modular plugs and one male 50-pin straight connector. For the pin-pair wiring, see Figure A-23 on page A-13. 50 pin to twelve 8-pin MP equipment cable



**Table 3-10: UTP Equipment/Device-Specific Cables Ordering Information**

Part Number	Description
BC29P-10	The BC29P AT modem cable connects a modem device to the <b>DIGITAL MultiSwitch 900</b> (formerly DEChub 900 MultiSwitch) <b>using the OBM</b> (out-of-band management) port on the management agent backplane. This cable is a straight-through cable because transmit and receive are not crossed over in the cable but rather inside the modem device. For the pin-pair wiring, see Table A-6 on page A-8. 10.0 m (32.7 ft) 9-pin D-Sub to 25-pin modem cable (OBM cable)
BC29Q-03	The BC29Q AT null modem cable connects a personal computer to the <b>DIGITAL MultiSwitch 900 using the OBM</b> port on the management agent backplane. This cable is a crossover cable since transmit and receive are crossed over in the cable. For the pin-pair wiring, see Table A-7 on page A-8. 3.0 m (9.8 ft) 9-pin D-sub to 9-pin D-sub AT null modem cable (OBM cable)
BC12F-06	The BC12F cable connects the synchronous port of the <b>DECbrouter 90T to X.21 devices</b> . This cable contains 30 conductors with a 50-pin male IDC connector on one end and a 15-pin male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-29 on page A-18. DECbrouter 90T X.21 cable interface
BC12G-06	The BC12G cable connects the synchronous port of the <b>DECbrouter 90T to V.35 devices</b> . This cable contains 30 conductors with a 50-pin male IDC connector on one end and a 34-pin male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-30 on page A-19. DECbrouter 90T V.35 cable interface
BC12H-06	The BC12H cable connects the synchronous port of the <b>DECbrouter 90T to RS-449, RS-422, and V.11 devices</b> . This cable contains 30 conductors with a 50-pin male IDC connector on one end and a 37-pin male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-31 on page A-20. DECbrouter 90T RS 449/RS 422/V.11 cable interface
BC12J-06	The BC12J cable connects the synchronous port of the <b>DECbrouter 90T to EIA-530A devices</b> . This cable contains 30 conductors with a 50-pin male IDC connector on one end and a 25-pin male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-32 on page A-21. DECbrouter 90T EIA-530A cable interface
BC12K-06	The BC12K cable connects the synchronous port of the <b>DECbrouter 90T to RS-449, RS-423, and V.10 devices</b> . This cable contains 30 conductors with a 50-pin male IDC connector on one end and a 37-pin male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-33 on page A-22. DECbrouter 90T RS-449, RS-423, and V.10 cable interface
BC12L-06	The BC12L cable connects the synchronous port of the <b>DECbrouter 90T to RS-232 and V.28 devices</b> . This cable contains 30 conductors with a 50-pin male IDC connector on one end and a 25-pin male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-34 on page A-23. DECbrouter 90T RS-232 and V.28 cable interface
BC19B-02	The BC19B-02 synchronous line adapter cable connects the <b>DEC WANrouter 90 50-pin D-connector to RS-422 devices</b> . The BC19B-02 is a 28-wire cable with a 50-pin, female D-connector on one end and a 37-pin, male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-26 on page A-16. Synchronous RS-422 Device Cable for DEC WANrouter90
BC19C-02	The BC19C-02 synchronous line adapter cable connects the <b>DEC WANrouter 90 50-pin D-connector to X.21 leased lines</b> . The BC19C-02 is a 7-wire cable with a 50-pin, female D-connector on one end and a 15-pin, male D-connector on the other. For the pin-pair wiring diagram, see on page Figure A-28 on page A-17. DEC WANrouter to X.21 leased lines
BC19E-02	The BC19E-02 synchronous line adapter cable connects the <b>DEC WANrouter 90 50-pin D-connector to RS-423-A devices</b> . The BC19E-02 is a 24-wire cable with a 50-pin, female connector on one end and a 37-pin, male D-connector on the other end. For the pin-pair wiring diagram, see Figure A-25 on page A-15. Synchronous RS-423 Device Cable to DEC WANrouter 90
BC19F-02	The BC19F-02 synchronous line adapter cable connects the <b>DEC WANrouter 90 50-pin D-connector to V.35 devices</b> . The BC19F-02 is a 16-wire cable with a 50-pin, female D-connector on one end and a 34-pin, male square connector on the other end. DEC WANrouter 90 to V.35
BN24K-03	The BN24K connects the 36-pin port of a <b>DECserver 200/DL or CXA16 terminal server</b> to the 50-pin port of the H3117-MA or patch panel insert. The BN24K is a shielded 18-twisted-pair cable configured with one male 36-pin right-angle connector and one male 50-pin straight connector. For the pin-pair wiring, see Table A-2 on page A-5. 3.0 m (9.8 ft) 50-pin to 36-pin equipment cable
BN24L-03	The BN24L connects the 6-pin MMJ ports of an <b>EIA-423-compliant server</b> , such as the DECserver 700, to the 50-pin port of the H3117-MA patch panel insert. The BN24L is an octopus cable configured with eight 6-pin modified modular plugs and one male 50-pin straight connector. For the pin-pair wiring, see Table A-3 on page A-6. 3.0 m (9.8 ft) 50-pin to eight 6-pin MMP equipment cable

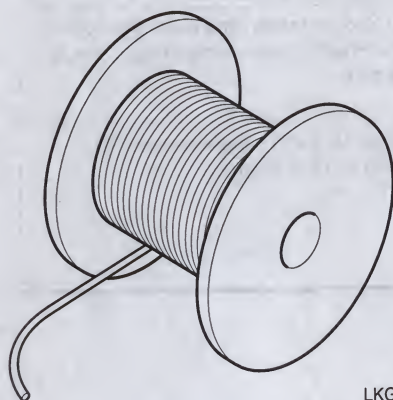


Table 3-10: UTP Equipment/Device-Specific Cables Ordering Information

Part Number	Description
BN26T-03	The BN26T is a Token Ring adapter cable with a built-in balun used to connect a 100-ohm <b>Token Ring</b> twisted-pair media access unit to the IBM cabling system. This cable is shielded and has a built-in balun for impedance matching. It should be used between the IBM cabling system and a 100-ohm twisted-pair MAU or repeater. Twisted-pair Token Ring balun cable, 100- to 150-ohm IBM
BN24J-01 BN24J-03 BN24J-07	The BN24J connects the 6-pin MMJ port of a <b>EIA-423 compliant server</b> to the 8-pin MJ patch panel insert jack. The BN24J is a three-twisted-pair cable configured with one 6-pin modified modular plug and one standard 8-pin modular plug. For the pin-pair wiring diagram, see Figure A-21 on page A-11. 6-pin MMP to 8-pin MP equipment cable: 1.0 m (3.3 ft) 3.0 m (9.8 ft) 7.0 m (23 ft)



## UTP Building Wire



LKG-5299±91I

Today, wiring systems must fit a variety of complex performance criteria, building environments, and regulatory requirements. DIGITAL supplies Ultra Performance Super-5 (TIA/EIA Category 5) and standard Category 5 products. See Figure 3-11. The Ultra Performance Category 5 cables are tested out to a frequency of 350 MHz to ensure that each cable exceeds the TIA/EIA specifications for Category 5. Available products include 25-pair Category 5 cables, dual 4-pair Category 5 cables, and Category 3 twisted-pair. Included in DIGITAL's offerings are cables for the European market that include UTP and foiled twisted-pair (see ScTP/FTP section) in both PVC and low smoke zero halogen (LSZH) materials. These cables meet TIA/EIA cable specifications and the IEC/ISO 11801 international standard specifications. The Category 3 cable supports up to and including 10 Mb/s applications, and the Super-5 cables support all applications, including ATM. See Table 3-11 for ordering information.

**Figure 3-11: Building Wire Features**

- Plenum and PVC construction
- Meets T568A, Category 5 standards
- Meets applicable safety regulations
- Reels or box packaging
- 4- and 25-pair cables available
- Ultra Performance Category 5 cables, 100% tested

**Table 3-11: Building Wire Ordering Information**

Part Number	Description
<b>Ultra Performance Category 5</b>	
H8245-AC	UTP, 4-pair, 24 AWG, Category 5 PVC 1,000 ft (305 m) reel — Ultra Performance
H8245-BC	UTP, 4-pair, 24 AWG, Category 5 PVC 1,000 ft (305 m) box — Ultra Performance
H8246-AC	UTP, 4-pair, 24 AWG, Category 5 plenum 1,000 ft (305 m) reel — Ultra Performance
H8246-BC	UTP, 4-pair, 24 AWG, Category 5 plenum 1,000 ft (305 m) box — Ultra Performance
H8247-AC	UTP, 25-pair, 24 AWG, Category 5 PVC 1,000 ft (305 m) reel — Ultra Performance
H8248-AC	UTP, 25-pair, 24 AWG, Category 5 plenum 1,000 ft (305 m) reel — Ultra Performance
<b>Category 5</b>	
H8246-C	UTP, 4-pair, 24 AWG, Category 5, plenum, 1,000 ft (305 m) reel — High Performance
H8245-C	UTP, 4-pair, 24 AWG, Category 5, PVC, 1,000 ft (305 m) reel — High Performance
<b>Category 3</b>	
H8246-A	UTP, 4-pair, standard data grade cable, Category 3, plenum-rated, 1,000 ft (305 m) reel
H8245-A	UTP, 4-pair, standard data grade cable, Category 3, PVC, 1,000 ft (305 m) reel
<b>European Specific</b>	
H8245-AA	UTP, 4-pair, 24 AWG, Category 5, PVC 1,000 ft (305 m) reel — High Performance
H8246-AA	UTP, 4-pair, 24 AWG, Category 5, LSZH 1,000 ft (305 m) reel — High Performance
H8247-AA	UTP, dual 4-pair, 24 AWG, Category 5, PVC 1,000 ft (305 m) reel — High Performance
H8248-AA	UTP, dual 4-pair, 24 AWG, Category 5, LSZH 1,000 ft (305 m) reel — High Performance



## 110 IDC Terminal Blocks

OPEN DECconnect's Category 5 110 IDC industry-standard terminal blocks shown in Figure 3-12 enable DIGITAL to provide a fully integrated voice and data wiring system. The 110 wiring block kits (H3217-AB/AC/AD) come in 50-, 100-, and 300-pair modular configurations. The wiring strips on the base are notched and divided (black on white) into 5-pair increments, facilitating the wiring of backbone cables. Stand-off legs detach during and after installation. This feature facilitates the installation of new cabling or upgrades to the installed wiring (legs for the 300-pair blocks are not detachable). Products are available in complete kits or as individual components. See Table 3-12 for ordering information.

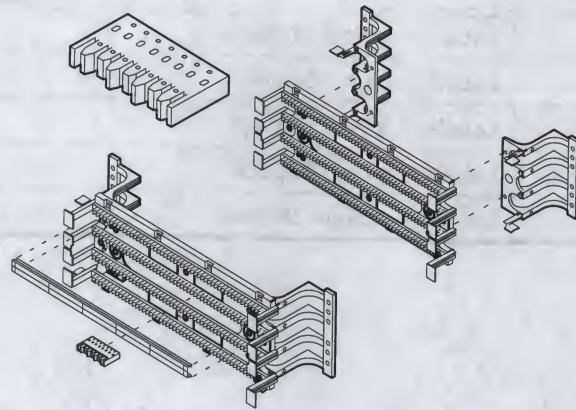


Figure 3-12: Family of Terminal Blocks

### Features

- UL and CSA approved
- Color coding label kits available separately
- Kits include terminal block, 4-pair wiring blocks, labels, and holders
- Category 5 compliant
- Prewired 50-pin to 110 option — Category 3
- Detachable legs on terminal block to facilitate wiring (except 300-pair block)

Table 3-12: 110 IDC Terminal Blocks Ordering Information

Part Number	Description
H3217-AB	110 IDC terminal block, 50 pair with 4-pair connector Kit Category 5
H3217-AC	110 IDC terminal block, 100 pair with 4-pair connector Kit Category 5
H3217-AD	110 IDC terminal block, 300 pair with 4-pair connector Kit Category 5
H3208-AA	110 IDC terminal block, 50 pair with mounting legs Category 5
H3208-AB	110 IDC terminal block, 100 pair with mounting legs Category 5
H3208-AC	110 IDC terminal block, 300 pair with mounting legs Category 5
H3208-BB	110 IDC Terminal Block, 50 Pair (No Legs) Category 5
H3208-BC	110 IDC Terminal Block, 100 Pair (No Legs) Category 5
H3207-AB	Prewired (2) 50-Pin CHAMP to 50-Pair 110 IDC Category 3
H3217-AE	110 IDC connector block, 3 pair Category 5
H3217-AF	110 IDC connector block, 4 pair Category 5
H3217-AG	110 IDC connector block, 5 pair Category 5
H3208-KA	Label holder, 6/pack
H3208-KB	Labels — white, 90/pack
H3208-KC	Labels — red, 90/pack
H3208-KD	Labels — gray, 90/pack



Table 3-12: 110 IDC Terminal Blocks Ordering Information

Part Number	Description
H3208-KE	Labels — yellow, 90/pack
H3208-KF	Labels — blue, 90/pack
H3208-KG	Labels — green, 90/pack
H3208-KH	Labels — violet, 90/pack
H3208-KI	Labels — orange, 90/pack

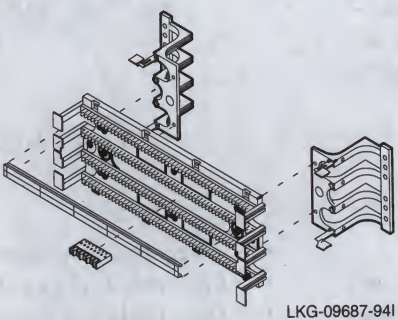


Figure 3-13: H3217-AB/AC

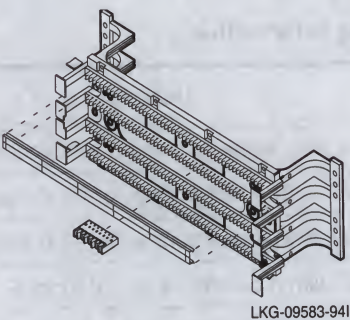


Figure 3-14: H3217-AD

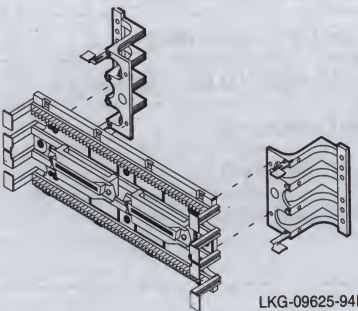


Figure 3-15: Prewired 50-Pin to 110 IDC (H3207-AB)



## UTP and ScTP Modular Plugs

For customers who require field terminated custom cable assemblies OPEN DECconnect carries an assortment of modular plugs (MPs). See Figure 3-16. DIGITAL's 8-pin modular plugs support unshielded and screened twisted-pair for stranded or solid-conductor cables. See Table 3-13 for ordering information.

The tool required to install the 6-pin MMP is the H8241 and the tool for the 8-pin plug is the H8100-G. See Figure 3-50.

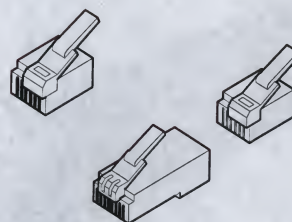


Figure 3-16: Family of UTP Connectors

### Features

- UTP and shielded connector available
- Connectors are 50-micron gold plated and supplied in bags of 50
- High quality and reliability

### Tips — Connector Installation

- DIGITAL does not recommend field termination for Category 5 performance patch cords or equipment cables. To ensure reliability and performance, always use factory terminated assemblies
- It is not recommended that you field terminate solid conductor building wire for use in your structured wiring system. Solid conductor wire will not withstand flexing and normal abuse over time, creating a point of failure
- Always use a transition point such as a patch panel or 110 termination block between building wiring and equipment for the long-term reliability of your system

Table 3-13: UTP and ScTP Modular Plugs Ordering Information

Part Number	Description
H8220	Modified modular plugs for stranded cable (6-pin MMP for H8240-00 cable)
H8226	Solid wire 6-pin modified modular plug kit (kit of 50)
H8226-AA	8-pin modular plugs for stranded unshielded twisted-pair (UTP) cable (kit of 50)
H8226-AB	8-pin screened modular plugs for stranded twisted-pair cable (kit of 50)



## OPEN DECconnect Screened Twisted-Pair (ScTP) System Components



Figure 3-17: ScTP/FTP Family of System Components

For those projects that need to meet additional security or EMI requirements, DIGITAL supplies a system of screened patch panel inserts, faceplate connectors, and cables. See Figure 3-17. All OPEN DECconnect Category 5 screened cables meet the same specifications as defined in TIA/EIA-568A (Category 5) and ISO/IEC 11801 standards covering generic cabling. See Table 3-14 for ordering information.

### Patch Panel and Faceplate Inserts

The screened system components may be installed in any of our patch panels, faceplate, or wallbox systems. Category 5 patch panel inserts and faceplate inserts are tested as a system to ensure compliance with defined performance specifications. The patch panel inserts (H3117-LE/LF/LB/LD) provide grounding tabs and can be linked or individually grounded according to requirements. Patch panel inserts and faceplate inserts are available in T568A and T568B wiring configurations. These products support 100-ohm screened or foiled cable types and allow the installation of 22 AWG to 26 AWG wire.

### Features

- Category 5 compliant
- Meets transfer impedance requirements
- T568A and B wiring available
- Meets ISO/IEC 11801
- Patch panel inserts include grounding tabs
- Securing points for cables and drain wire

### Cable Assemblies

The ScTP system provides a series of 8-pin MPs and 6-pin MMPs cable assemblies for Category 5 and Category 3 implementations. DIGITAL's high-performance modular patch cables provide enhanced Category 5 channel performance. All modular patch cord connectors are gold plated to provide excellent long-term performance. The cables come in standard lengths.

### Building Cable

DIGITAL has a variety of ScTP/FTP media types that support a wide range of applications and environments. The high-performance Super-5 (TIA/EIA Category 5) offerings are for the European market, and are available in both PVC and low smoke zero halogen (LSZH) materials. All cables meet or exceed TIA/EIA cable specifications and IEC/ISO 11801 international standard specifications. These cables supports 100-MHz applications, including 155 Mb/s ATM.

DIGITAL's ScTP/FTP high-performance Super-5 cables are included in the OPEN DECconnect 15-year System Applications Assurance Warranty.



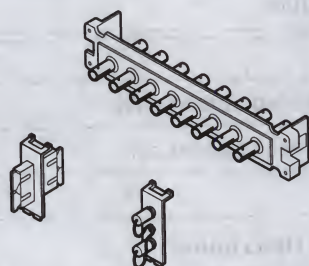
Table 3-14: Screened Twisted-Pair System Components Ordering Information

Part Number		Dimension/Description	
Faceplates/Connectors			
H3112-HV	(8) ScTP, MJ-110, T568A, Super-5, Category 5 (Screened/Foiled twisted-pair)		
H3112-JV	(8) ScTP, MJ-110, T568B, Super-5, Category 5 (Screened/Foiled twisted-pair)		
Patch Panel Inserts			
Part Number	# Ports	Wiring	Description
H3117-LE	8	T568A	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-LF	8	T568B	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-LB	8	T568A	ScTP (FTP), 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-LD	8	T568B	ScTP (FTP) 110-8MJ, Category 5 (Screened/Foiled twisted-pair)
H3117-NB	8	NA	ScTP, 8MJ-8MJ, Category 3
Patch Cables/Equipment Cables/Office Cables			
BN26M-0E BN26M-01 BN26M-03 BN26M-04 BN26M-07	The BN26M is a screened, 26 AWG, four-twisted-pair, stranded, TIA/EIA Category 5 cable. It is configured with shielded, 8-pin modular plugs, wired pin-to-pin. It provides connectivity for applications such as <b>802.3/10BaseT</b> , <b>100Base-TX</b> , <b>100Base-T4</b> , <b>TP-PMD</b> , <b>ATM</b> , <b>802.5/Token Ring</b> , and <b>ISDN</b> . For the pin-pair wiring diagram, see Figure A-12 on page A-10. 0.5 m (1.65 ft) 1.0 m (3.3 ft) 3.0 m (9.8 ft) 4.0 m (13.1 ft) 7.0 m (22.96 ft)		
BN26S-03	The BN26S is a screened 100-ohm Category 5 office cable that supports copper <b>FDDI (TP-PMD) devices</b> in an office environment (DTE to DTE). This cable connects either two FDDI devices directly or an FDDI interface card such as the FDDIcontroller/EISA UTP to an office faceplate. For the pin-pair wiring diagram, see Figure A-10 on page A-10. 8-pin MP to 8-pin MP office cable (crossover): 3.0 m (9.8 ft)		
BN28Q-01 BN28Q-0E BN28Q-03 BN28Q-04 BN28Q-07	The BN28Q supports the ScTP local connection of <b>100BaseT</b> or <b>10BaseT</b> products in an office or lab area. For the pin-pair wiring diagram see Figure A-22 on page A-11. 8-pin MP to 8-pin MP crossover office cable (DTE to DTE): 1.0 m (3.3 ft) 0.5 m (1.65 ft) 3.0 m (9.8 ft) 4.0 m (13.1 ft) 7.0 m (22.96 ft)		
H8240-B*	The H8240-B is an eight-conductor four-pair, PVC, 100-ohm 26 AWG TIA/EIA Category 5 high-performance data-grade, stranded, screened, twisted-pair cable. This ScTP cable is used to make custom patch cables.		
Building Cable — Europe-Specific			
H8245-CA	FTP (ScTP). 4-pair Category 5, 24 AWG PVC, 305 m.		
H8246-CA	FTP (ScTP). 4-pair Category 5, 24 AWG LSZH, 305 m.		
H8247-CA	FTP (ScTP). Dual 4-pair Category 5, 24 AWG PVC, 305 m.		
H8248-CA	FTP (ScTP). Dual 4-pair Category 5, 24 AWG LSZH, 305 m.		

\*To make custom office cables only. DIGITAL does not recommend making Category 5 cable assemblies in the field.



## OPEN DECconnect Patch Panels and Faceplate Inserts for Fiber-Optic Systems



LKG-10341-961

Whether providing a fiber-optic solution in the LAN backbone or to the desk, OPEN DECconnect provides feature-rich innovative solutions. Fiber products include patch panel and faceplate modules for multimode and single mode fiber installations.

**Figure 3-18: Patch Panels and Faceplate Inserts for Fiber-Optic Systems**

### Patch Panel Modules

DIGITAL provides patching solutions for SC and ST style connections with modules that snap or screw into our H3108 series patch panels. SC-type modules include multimode (beige) and single-mode (blue) fiber applications. Each module contains four SC dual couplers or eight ST bayonet-style couplers and install in all patch panel variations. Following our modular approach, the patch panels can be installed with mixed media, ST and SC connections, or “mixed and matched” with other media types as required for smaller installations. The benefits are cost savings, flexibility, and growth as future needs dictate while protecting your installed investment.

### Faceplate Modules

Three multimode faceplate inserts are available, SC dual coupler, ST dual bayonet coupler, and FDDI (MIC). These couplers install into the faceplate and wallbox options for fiber to the desk or work area solutions. Tools are not required because the couplers snap in directly. The flexibility of the OPEN DECconnect system allows the installation of mixed media into the work area the faceplate and wallbox allow a combination of fiber, twisted pair, or coax media.

### Features

- Single mode and multimode products available
- Low cost, scalable solutions
- Mix and match multiple media solutions
- High repeatability and low loss

**Table 3-15: Fiber Patch Panel Inserts Ordering Information**

Part Number	#Ports	Description
H3117-SA	8	8 Bayonet ST couplers
H3117-SC	8	4 Dual SC MM coupler — beige couplers
H3117-SD	8	4 Dual SC SM coupler — blue couplers

**Table 3-16: Fiber Faceplate/Wallbox Connectors Ordering Information**

Part Number	Description
H3114-FF	8 Dual ST bayonet couplers per pack
H3114-FE	8 FDDI connectors per pack for modular wallbox
H3114-FI	Dual SC coupler, 1 per pack — beige coupler



## Fiber-Optic Patch Cables, Office Cables, and Equipment Cables

Fiber-optic patching and office cables must fit a variety of product and connector applications. DIGITAL provides a series of cables that support any combination of SC, ST, and ANSI MIC connections for active and passive system components in the office equipment or equipment room environment. These assemblies are designed for advanced fiber-optic systems requiring stability, low loss, and high density. These duplex fiber cables offer easy connectivity and reliability between transmission and receiver equipment. All cables are color coded for transmit and receive coding schemes.



Figure 3-19: Fiber-Optic Patch Cables, Office Cables, & Equipment Cables for Fiber

### Features

- 100% factory tested and documented
- Zirconia Ceramic ferrules
- Extended performance characteristics
- Duplex cables SC/ST/FDDI MIC
- Simplify cable management
- Custom design

Table 3-17: Equipment Room Cables Ordering Information

Part Number	Description
BN24B-01 BN24B-03 BN24B-4E BN24B-10 BN24B-20 BN24B-30	FDDI-to-FDDI (MIC) multimode, duplex with color coded connector cables: 1.0 m (3.3 ft) 3.0 m (9.8 ft) 4.5 m (14.85 ft) 10.0 m (32.8 ft) 20.0 m (65.6 ft) 30.0 m (98.4 ft)
BN24D-01 BN24D-03 BN24D-4E BN24D-10 BN24D-20 BN24D-30	FDDI-to-ST bayonet Polymer connector, multimode, duplex with color coded boots: 1.0 m (3.3 ft) 3.0 m (9.8 ft) 4.5 m (14.85 ft) 10.0 m (32.8 ft) 20.0 m (65.6 ft) 30.0 m (98.4 ft)
BN24E-01 BN24E-03 BN24E-4E BN24E-10 BN24E-20 BN24E-30	ST-to-ST bayonet, Polymer connectors, multimode, duplex cables, with color coded boots: 1.0 m (3.3 ft) 3.0 m (9.8 ft) 4.5 m (14.85 ft) 10.0 m (32.8 ft) 20.0 m (65.6 ft) 30.0 m (98.4 ft)



**Table 3-17: Equipment Room Cables Ordering Information**

Part Number	Description
BN34A-01 BN34A-2E BN34A-03 BN34A-4E BN34A-10 BN34A-20 BN34A-30	ST-to-SC, high performance, multimode, duplex cables with metal ST connectors with Zirconic ferrule and color coded boots: 1.0 m (3.3 ft) 2.5 meter 3.0 meter 4.5 meter 10 meter 20 meter 30 meter
BN34B-01 BN34B-2E BN34B-03 BN34B-4E BN34B-10 BN34B-20 BN34B-30	SC-to-SC multimode, duplex cables with color coded boots: 1.0 m (3.3 ft) 2.5 meter 3.0 meter 4.5 meter 10 meter 20 meter 30 meter
BN34C-01 BN34C-2E BN34C-03 BN34C-4E BN34C-10 BN34C-20 BN34C-30	ST-ST, high performance, metal connectors with Zirconic ferrule, duplex cables, and color coded boots: 1.0 m (3.3 ft) 2.5 meter 3.0 meter 4.5 meter 10 meter 20 meter 30 meter
BN34D-01 BN34D-03 BN34D-10	SC-to-FDDI (MIC) multimode, duplex cables, color coded: 1.0 m (3.3 ft) 3.0 meter 10.0 meter





## Fiber-Optic Cables for Building Wiring

DIGITAL provides an offering of commonly used fiber-optic cables for riser and distribution applications. They are tight buffered cables in standard configurations of 2, 4, 6, and 12 multimode fiber counts. A 6-fiber single mode cable is also included. These building wiring cables can be used as interbuilding or intrabuilding backbones or fiber distribution to work areas. The rugged design, precision manufacturing, and testing of each fiber guarantees the quality and consistency of every foot of cable to be installed. Various cable construction is available for light and heavy duty applications.



Figure 3-20: Building Wire

### Features

- 100% fiber testing
- Single mode/multimode
- 2, 4, 6, and 12 multimode fiber counts
- Fiber test report with each reel
- UL/CSA approved

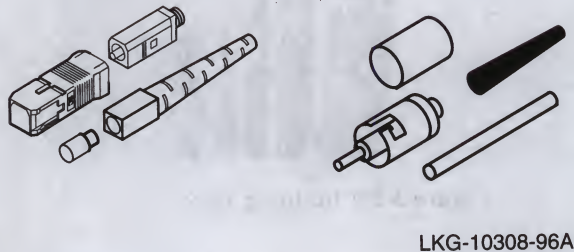
Tight Buffer Optical Performance							
						Multimode 62.5/125um FDDI Grade	
						850nm/1300nm	
Max Attenuation (dB/km)						3.7/1.5	
Typical Attenuation (dB/km)						3.3/1.0	
Maximum Bandwidth (MHz/km)						160/500	
Fiber Specifications							
Multimode (62.5/125um)	Core Diameter (microns)	Cladding Diameter (microns)	Coating Diameter (microns)	Refractive Index Delta	Numerical Aperture	Core Eccentricity	Core Ovality
	62.5±3.0	125±2.0	250±15	1.9%			
Single Mode	Core Diameter (microns)	Cladding Diameter (microns)	Coating Diameter (microns)	Mode Field Diameter (microns)	Cut-off Wavelength	Core Eccentricity	Zero Dispersion Range (nm)
	8.3 nominal	125±2.0	250±15	9.3±0.5	1250±70nm	<1.0%	1310±10

Table 3-18: Fiber-Optic Cable Ordering Information (tight buffered, 1000 ft (305 m) reel)

Part Number	Description	Part Number	Description
H8250-AC	2 Fiber, 62.5/125 multimode, plenum cordage	H8251-FC	6 Fiber, 62.5/125 multimode, plenum light duty
H8251-AC	4 Fiber, 62.5/125 multimode, plenum light duty	H8250-KC	12 Fiber, 62.5/125 multimode, PVC heavy duty
H8250-DC	4 Fiber, 62.5/125 multimode, PVC light duty	H8251-LC	12 Fiber, 62.5/125 multimode, PVC light duty
H8250-FC	6 Fiber, 62.5/125 multimode, PVC light duty	H8251-KC	12 Fiber, 62.5/125 multimode, plenum light duty
H8252-FC	6 Fiber, single mode, PVC light duty		

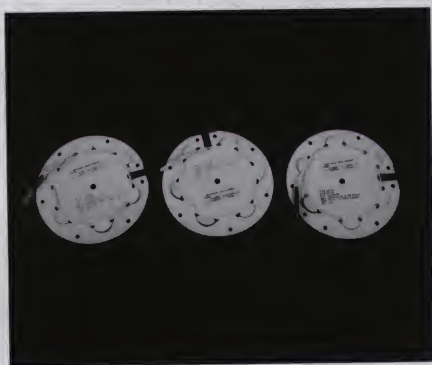


## Connectors and Splices for Fiber

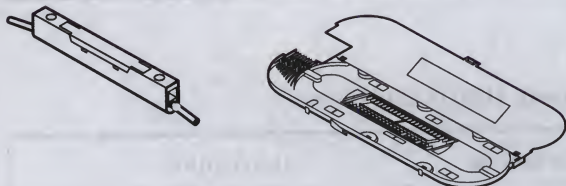


LKG-10308-96A

**Figure 3-21: Fiber Optic Connectors for Fiber**



**Figure 3-22: Pigtail Assemblies**



LKG-10309-96A

**Figure 3-23: Fiber Splices and Organizer**

### Connectors

For projects that require field-terminated connections, DIGITAL supplies quality, fast, and effective splices and connectors. The field termination connectors are easy to install and come in both multimode and single-mode variations and SC and metal ST bayonet type connectors. All connectors are preloaded with adhesives and use HOT MELT technology to provide a fast, efficient connection without the mess from typical adhesive injection methods. All connectors use zirconia ceramic ferrules that provide a high degree of strength, reliability, and performance over many years of use. The ST-type bayonet connectors use a pre-radiused zirconia ceramic ferrule that provides a high degree of reliability. Each connector kit includes six connectors and color-coded boots for easy system identification.

### Pigtails

If you are transitioning from fiber splices to equipment or patch fields, DIGITAL offers a selection of preconnectorized pigtail cables. They are available in single mode and multimode, and SC and ST bayonet style connectors. All pigtails are factory assembled and 100% tested for quality and reliability. Test data is supplied. The simplex fiber is 900 micron buffered 62.5/125 for maximum flexibility. Each pigtail is supplied with a color-coded boot for easy system identification. Kits include six pigtail assemblies.

### Splices and Splice Organizer

The OPEN DECconnect system uses the mechanical Fiblok splicing system to provide a precise, simple, low-cost method of splicing. Each splice uses a metallic splicing element held inside a precision molded plastic body to provide a fast, permanent low-loss splice. The universal splice may be used to for any combination of 250 to 900 micron-coated fibers. These splices are to be used with the H3107-GA fiber-optic splice organizer which accommodates up to 24 fiber splices. Adapters are available to hold up to 12 fusion splices. Organizers may be stacked to provide greater splicing density while retaining accessibility to all units. Tool kits are available for all of the above products.



## Connectors and Splices for Fiber

### Features

- Connectors use HOT MELT technology
- Connectors have zirconia ceramic ferrules
- Mechanical Fibrlok splices
- Easy to install
- Splice organizers hold up to 24 splices and are stackable

**Table 3-19: Fiber Connectors/Pigtails and Splice Ordering Information**

Part Number	Description
H3114-FK	ST bayonet, metal connector, SM, Epoxy, kit of six
H3114-FL	ST bayonet, metal connector, MM, HOT MELT, kit of six
H3114-FN	SC, P-P connector, MM, HOT MELT, kit of six
H3114-FO	SC, P-P connector, SM, Epoxy, kit of six
H3114-FS	Universal optical fiber splice, kit of six
H3118-FA	2.5 mm bayonet ST type pigtail assembly kit (6 pigtails), 3 meters
H3118-FB	ST fiber-optic pigtail, 900 um MM, kit of six, 3 meters
H3118-FC	SC P-P fiber-optic pigtail, 900 um MM, kit of six, 3 meters
H3118-FD	ST fiber-optic pigtail, 126 um SM, kit of six, 3 meters
H3118-FE	SC P-P fiber-optic pigtail, 126 um SM, kit of six, 3 meters
H3107-GA	Fiber-optic splice organizer, holds 48 fibers
H3107-GB	Fusion insert for fiber-optic splice organizer, two per pack



## Fiber Distribution Units



Figure 3-24: H3114-GA and H3107-GC

High density durable metal fiber distribution units and accessories support fiber termination and cable management for up to 144 connections. These units are modular and scalable with front and rear access for easy installation. This fiber distribution system supports single and multimode fiber cabling, ST or SC connectors, and has integral cable management and splice connectors for mechanical and fusion splices in the same box.

### High-Density Fiber Distribution Units

The **H3107-GC** and the **H3107-KA** are high-density units that support up to 144 fiber terminations. They provide crossconnect and interconnection between incoming fiber cables and fiber equipment jumpers. The building fibers enter the rear half of the unit and attach to connectors which plug into couplings that are mounted on coupler panels. The cables can enter either the unit's side, top, or bottom. The coupling plates are available with 6 or 12 ST couplings or 6 or 8 SC couplings and are interchangeable to permit rapid adaptation to different fiber ends, coupling types and modes. The **H3107-GC** provides the same functionality as the KA. However, the rear panel is extended and hinged to accept the installation of the **H3107-GA** fiber splice organizer described on page 3-26). Both units have cable management equipment and brackets for mounting in 19 in. (48.3cm) and 23 in. (58.5cm) equipment racks. Front panels are lexan with line assignment cards provided.

### Features

- High density up to 144 connections
- Supports single and multimode fibers
- Integral cable management
- Interchangeable coupler plates
- Lexan front hinged panel
- Optional splice organizer capabilities

### Fiber-Optic Coupler Panels H3114-GA/GB/GC/GD/GE/GF/GG

The fiber coupler panels are preloaded with ST or SC single and multimode fiber connections. They are available in two densities of 6 or 12 ST and 6 or 8 SC couplers per panel. All coupler panels fit the H3107-GC, H3107-KA and H3131-CA fiber distribution units. See Table 3-21 for details.

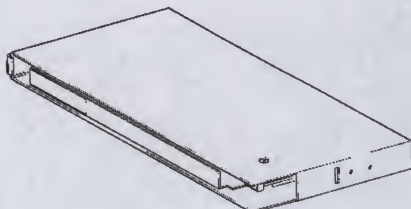


Figure 3-25: Low-Density Fiber Distributor Unit

### Low-Density Fiber Distribution Unit

The **H3107-JA** fiber distribution unit consists of a terminal housing and optional swing-out drawers. Available options include the **H3107-JB** splice drawer which holds up to 24 universal mechanical splices. Also available are **H3107-JC/** **JD/** **JE/** **JF** drawers with 24 ST and SC multimode and single mode couplers.



## Fiber Distribution Units

### Remote Wallmounted Enclosure for Fiber-Optic Cable (H3131-CA)

The H3131-CA Remote Wall Enclosure and optional H3114-G\* Coupler Panel System provides a central access point for splicing and interconnection of fiber optic cables within a customer's premises. This economical modular system provides the facility for fiber termination and interconnection or cable storage. The wall mountable module can be used alone, or in conjunction with additional modules, providing flexibility for a wide variety of network configurations. The H3131-CA Enclosure is a wallmountable unit and can accommodate from 6 to 24 couplers.



Figure 3-26: Remote Wallmounted Enclosure (H3131-CA)

Table 3-20: Fiber Distribution Units Ordering Information

Part Number	Description	Dimensions
H3107-GC	High-Density Distribution Unit up to 144 and H3107-GA splice Tray	H-6 11/16 x W-19 x D-12 1/2
H3107-KA	High-Density Distribution Unit up to 144 Housing only	H-6 11/16 x W-19 x D-12 3/8
H3131-CA	Remote Wall Mount Enclosure (supports up to 2 H3114-Gx Coupler panels)	H-8 7/8 x W-8 7/8 x D-4
H3114-GA	6-port ST/MM coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3114-GB	6-port ST/SM coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3114-GC	6-port SC/MM coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3114-GD	6-port SC/SM coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3114-GE	Blank coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3114-GF	12-port ST/MM coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3114-GG	8-port SC/MM coupler panel for H3107-GC, KA, or H3131-CA	N/A
H3107-JA	Low-Density Distribution Unit (Housing only)	H-1 5/8 x W-19 x D-10
H3107-JB	Splice Drawer (housing only) for H3107-JA	H-1 3/16 x W-16 x D-8 3/8
H3107-JC	Drawer for H3107-JA with 24 ST/MM couplers and splice holders	H-1 3/16 x W-16 x D-8 3/8
H3107-JD	Drawer for H3107-JA with 24 ST/SM couplers and splice holders	H-1 3/16 x W-16 x D-8 3/8
H3107-JE	Drawer for H3107-JA with 24 SC/MM couplers and splice holders	H-1 3/16 x W-16 x D-8 3/8
H3107-JF	Drawer for H3107-JA with 24 SC/SM couplers and splice holders	H-1 3/16 x W-16 x D-8 3/8



Table 3-21: Capacities Chart for Fiber Enclosures

Part Number	# Plates	ST/Plate		SC/Plate		# Splice Org	# Splices
		6	12	6	12		
H3107-GC	12	72	144	72	96	3	72
H3107-KA	12	72	144	72	96	NA	NA
H3131-CA	2	12	24	12	16	NA	NA

NEW

NEW

NEW



## OPEN DECconnect Faceplates and Patch Panel Inserts for Coaxial Cable

The OPEN DECconnect coaxial faceplate connectors in Figure 3-27 snap directly into the office faceplate or wallbox and do not require installation tools. The office faceplate supports either two coax daisy-chain connectors or up to four coax connections — any combination of BNC connectors for ThinWire Ethernet and F-style cable television (CATV) connectors. The wiring system also provides a BNC, (8) connectors, module for use with the OPEN DECconnect H3108 series of patch panels. See Table 3-22 for ordering information.

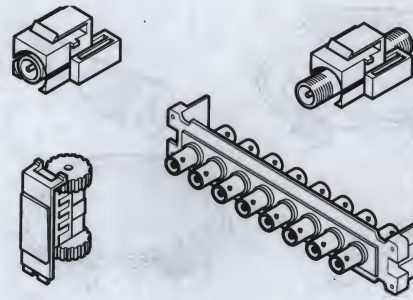


Figure 3-27: Faceplate/Patch Panel Inserts for Coaxial Cable

### Features

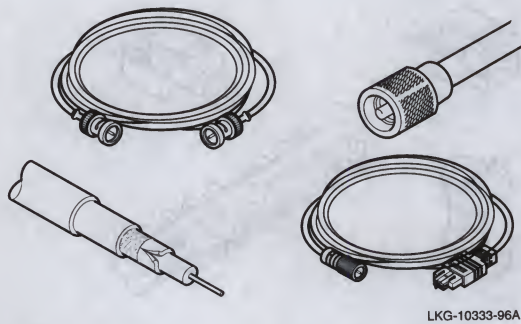
- High-density BNC patch insert
- Support for video/CATV
- BNC ThinWire Support
- Office daisy-chaining

Table 3-22: Faceplate Connectors for Coaxial Cable Ordering Information

Part Number	Description
H3114-AA	8 Daisy-chain wall connectors. Includes one 50-ohm terminator
H3114-AB	8 ThinWire BNC
H3115-AA	8 Video connector with snap-in adapter
H3117-PA	Patch panel insert kit, contains eight BNC couplers



## Coaxial Cables (Office/Equipment/Building)



The OPEN DECconnect Structured Wiring System supports a full line of ThinWire and standard thick wire cables for the building backbone or floor distribution or office connections. See Figure 3-28. In the office area, the system supports direct connection to the BNC faceplate connector or daisy-chaining. For the equipment room, DIGITAL also provides BNC equipment and patch cables. Because the 802.3 standard requires single point grounding, all the components used in the office area are overmolded to prevent accidental grounding. See Table 3-23 for ordering information.

**Figure 3-28: Coaxial Equipment Cables**

### Features

- Custom design
- Office and backbone
- Daisy-chain cables
- Overmolded office components
- ThinWire and thick wire cables
- Bulk or reeled cable and assemblies

**Table 3-23: Coaxial Patch Cables/Office Cables Ordering Information**

Part Number	Description
<b>Backbone Cable</b>	
H8243-A	ThinWire coaxial cable, PVC, 305 m (1,000-ft) reel
H8244-A	ThinWire coaxial cable, plenum-rated, 305 m (1,000-ft) reel
BNE2A-MA	802.3 Thick wire Ethernet plenum-rated cable, 23.4 m (76.8 ft)
BNE2A-MB	802.3 Thick wire Ethernet plenum-rated cable, 70.2 m (230.3 ft)
BNE2A-MC	802.3 Thick wire Ethernet plenum-rated cable, 117 m (383.9 ft)
BNE2A-ME	802.3 Thick wire Ethernet plenum-rated cable, 500 m (1,640.5 ft)
BNE2B-MA	802.3 Thick wire Ethernet PVC cable, 23.4 m (76.8 ft)
BNE2B-MB	802.3 Thick wire Ethernet PVC cable, 70.2 m (230.3 ft)
BNE2B-MC	802.3 Thick wire Ethernet PVC cable, 117 m (383.9 ft)
BNE2B-ME	802.3 Thick wire Ethernet PVC cable, 500 m (1,640.5 ft)
<b>Equipment/Office Cable Assemblies</b>	
BC16K-02	ThinWire coaxial equipment cables: 2 ft (0.6 m) 10 ft (3.05 m)
BC16K-10	
BC16M-06	ThinWire coaxial cables: 6 ft (1.8 m) 15 ft (4.6 m) 30 ft (9.2 m)
BC16M-15	
BC16M-30	
BN24A-2E	Daisy-chain connector office cable: 2.5 m (8.2 ft) 3.6 m (11.8 ft)
BN24A-3E	



## Miscellaneous Connectors for Coaxial Cable

Coaxial connectors are available (see Figure 3-29) to supplement the installation of ThinWire and thick wire networks. These connectors are field installable with the use of the coaxial tool sets supplied by DIGITAL.

DIGITAL also supplies a series of overmolded terminators, barrel connectors, and T-connectors for use in the office environment to prevent accidental grounding. See Table 3-24 for ordering information.

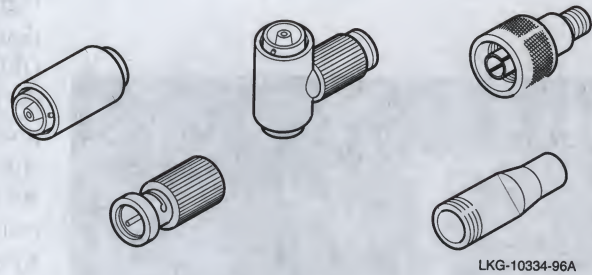


Figure 3-29: Coaxial Cable Connectors

### Features

- ThinWire and thick wire components
- Overmolded
- UL and CSA approved
- Field installable

Table 3-24: UTP Connectors Ordering Information

Part Number	Description
12-19816-01	Terminator
12-19817-01	Barrel connector
12-21766-01	Ground clamp
H4056	End connector, thick wire Ethernet
H8222	Ethernet ThinWire end connector
H8223	ThinWire T-connector
H8224	ThinWire barrel connector
H8225	ThinWire terminator (50-ohm)



## Mechanical Assemblies



**Figure 3-30: Modular Mounting System with Cover (DERMS-FA)**

### Features

- Aesthetics
- Ease of installation
- Flexibility
- Modularity
- User friendliness
- Competitive pricing

The OPEN DECconnect Modular Mounting System (see Figure 3-30) provides innovative solutions for LAN installations. The Modular Mounting System supports the complete OPEN DECconnect Structured Wiring System in addition to the DEChub 90/900 networking platforms, or any other products that are RETMA standard compliant. Convenient front access to all connections provides easy maintenance. An optional cover provides security and visibility to all control LEDs on active products. The Modular Mounting System installs easily and quickly. All the modular products from DIGITAL snap into place making them easy to arrange for a variety of configurations. As the LAN grows and networking requirements expand, simply add a new modular kit to support the configurations. This space-saving system meets the needs of environments such as wiring closets with limited space, computer rooms, or offices with modular furniture. Figure 3-31 illustrates a Modular Mounting System starter kit with covers and extension options. Other options for the Modular Mounting System include partition mounting brackets, patch panels with brackets, work surface trays for the patch panels, cable manager brackets, RETMA rack, and — for security — lockable covers. See Table 3-25 for ordering information.

*Note: The Modular Mounting System's covers were designed to cover the DEChub 90 and DIGITAL MultiSwitch 900 platforms.*

**Table 3-25: Module Mounting System Ordering Information**

Part Number	Description	Height	Width	Depth
DERMS-AA	Modular mounting system starter kit	32.0"	22.0"	NA
DERMS-BA	Extension kit for DERMS-AA with bracket for DEHUX-FA single cover	20.0"	22.0"	NA
DERMS-CA	Partition mounting bracket for DERMS-AA	NA	NA	NA
DERMS-DA	Double-height cover for DERMS-AA	30.0"	24.0"	14.0"
DEHUX-FA	Single cover for DERMS-BA	15.0"	24.0"	14.0"
DERMS-EA	Lock for DERMS/DEHUX covers	NA	NA	NA
DERMS-FA	Modular Mounting System with cover (DERM-AA/DA Kit)	30.0"	24.0"	14.0"



## Modular Mounting System Accessories

Designed for flexibility, the Modular Mounting System mounts to the wall and expands by adding available options. This space saving system meets the needs of many environments such as in wiring closets with limited space, computer rooms, and offices with modular furniture. This system consists of a series of snap-together rails that form the base level of the mounting system. This platform supports a DEChub 90, DIGITAL MultiSwitch 900, and most other networking products. Other options for the Modular Mounting System include partition mounting brackets, patch panels with brackets, work surface trays for the patch panels, cable manager brackets, RETMA rack, and for security, lockable covers.

### Modular Mounting System Starter Kit (DERMS-AA) and Options

The Modular Mounting System starter kit (DERMS-AA, see Figure 3-31) equipment that does not require the floor space of traditional standing equipment racks.

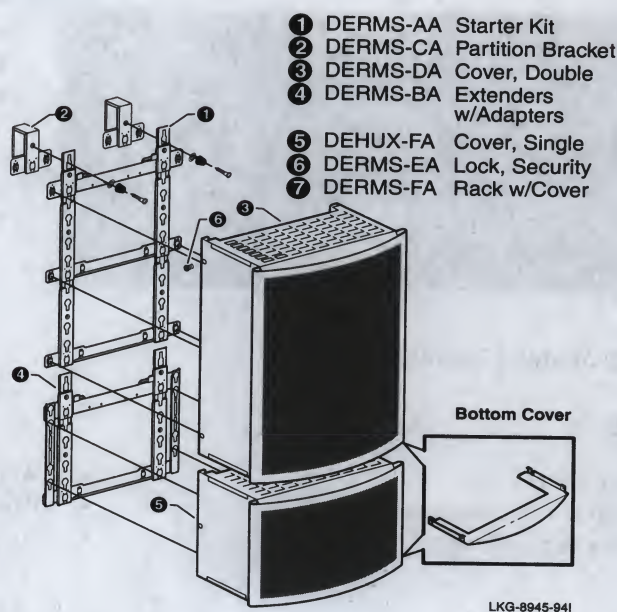


Figure 3-31: Modular Mounting System (DERMS)

### Modular Mounting System with Cover (DERMS-FA)

The DERMS-FA (see Figure 3-31) kit consists of a DERMS-AA starter kit and a double-height cover (DERMS-DA). The cover snaps directly onto the base system to protect any active equipment or cable patching platforms. Optional locks are available for the covers.

### Single Modular Mounting System Extender Kit (DERMS-BA)

The DERMS-BA (see Figure 3-31) is an optional mounting extender kit for the starter kit. It contains a single set of rails and has a set of adapter brackets to adapt to the single cover (DEHUX-FA). This system snaps directly onto the DERMS-AA. This option is for those customers who need to add to their base system and do not require the mounting space provided by a second DERMS-AA. The DERMS-BA may also be used as a single mounting platform for smaller applications.

### Double-Height Cover for Hub (DERMS-DA)

The DERMS-DA (see Figure 3-31) is a double-height cover used in conjunction with the basic starter kit, DERMS-AA. This cover is for those customers that already have a DERMS-AA previously mounted and now require it to be covered.

### Single Cover for Hub (DEHUX-FA)

The DEHUX-FA (see Figure 3-31) a single-height cover used with the DERMS-BA extender kit. This cover is for those customers who already have a DERMS-BA previously mounted and now require it to be covered.



## Modular Mounting Optional Components



**Figure 3-32: Modular Mounting Options**

### Features

- Wallmount racks
- Snap-in cable management products
- Fiber management
- Workgroup solutions
- Punchdown work surfaces
- Solutions for limited space installations



**Figure 3-33: RETMA Rack Mounting Bracket (H3108-RA)**



**Figure 3-34: Angled RETMA Mounting Bracket (H3108-RB)**

OPEN DECconnect designed a versatile series of mechanical mounting options that may be used with the Modular Mounting system, be rack mounted, or attached directly to a hard wall (see Figure 3-32). These components supply a vertical platform for active hubs, patch panels, cable management components, or other rackmounting options. See Tables 3-26 and 3-27 for ordering information.

### RETMA Rack Mounting Bracket (H3108-RA)

The H3108-RA mounting brackets (see Figure 3-33) provide an optional 19-inch RETMA rack option to the modular mounting platform. The H3108-RA is sturdy enough to be mounted on a wall standalone on a desk, or with the Modular Mounting system. The rack option provides 12.5 inches (7U) of mounting space and may be stacked to create a versatile wallmount rack.

### Angled RETMA Mounting Bracket (H3108-RB)

The H3108-RB is an angled 19-inch RETMA standard rack. By angling the rack, it allows rear wiring access for network connections or power cords for active or passive products with mounting depths up to 12 inches. The versatility of the H3108-RB allows it to be mounted on the modular mounting system or wallmounted.



Table 3-26: Modular Mounting System and Options Ordering Information

Part Number	Description	Height	Width	Depth	U-Ref
<b>Modular Mounting System</b>					
DERMS-AA	Modular Mounting System Starter Kit and Options	32.0"	22.0"		
DERMS-BA	Single Modular Mounting System Extender Kit	20.0"	22.0"		
DERMS-FA	Modular Mounting System with Cover	30.0"	24.0"	14.0"	
DERMS-DA	Double-Height Cover for Hub	30.0"	24.0"	14.0"	
DEHUX-FA	Single Cover for Hub	15.0"	24.0"	14.0"	
DERMS-CA	Wall Partition Bracket				
DERMS-EA	Security Lock				
<b>Rack Mounting</b>					
H3108-IA	Patch Panel Wallmount Bracket	5.25"	19.0"	9.0"	3U
H3108-RA	RETMA mounting bracket	12.5"	19.0"	12.0"	7U
H3108-RB	RETMA angular mounting bracket	12.5"	19.0"	12.0"	7U
<b>Cable Management</b>					
H3108-AA	Cable organizer kit, recess-mounted	1.75"	19.0"	3.0"	1U
H3108-CR	Rackmount cable management Kit	3.50"	19.0"	3.0"	2U
H3108-CS	Cable management kit for use with only H3108-CT or H3108-CW				
H3108-CT	RETMA rackmount brackets for H3108-CS				
H3108-CW	Wallmount cable management bracket	15.0"	19.0"	9.0"	3U
H3108-EA	Cable organizer kit, flush-mounted	1.75"	19.0"		1U
<b>Miscellaneous</b>					
H3108-TC	Universal Equipment Shelf	5.25"	19.0"	12.0"	
H3108-TA	Work surface tray, sliding for H3108-IA bracket				
H3108-TB	Work surface for rack-mounted patch panels				
H3108-TF	Metal tray for fiber splice for H3107-GA and H3108-IA bracket		19.0"	9.0"	3U
H3108-TH	Hardware mounting kit for H3108-TB work surface				
H3108-TG	Cover for H3108-IA bracket		19.0"	9.0"	



## Modular Mounting System Accessories

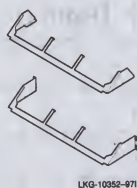


Figure 3-35: Work Surface Trays H3108-TA, Sliding (top), H3208-TB, Hanging (bottom)

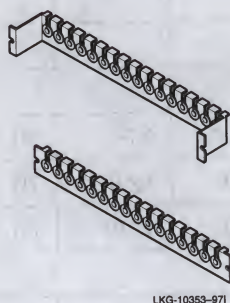


Figure 3-36: Cable Organizer Kits — H3108-EA/AA

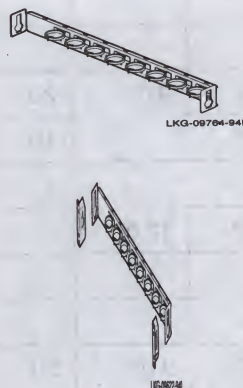


Figure 3-37: Cable Management Kits



Figure 3-38: Rack Blanking Plates H3108-BF, H3108-BE

### Work Surface Tray (H3108-TA, Sliding) (H3108-TB, Hanging)

The H3108-TA (see Figure 3-35) is an integrated work surface that can be added to the H3108-PA/BC. These work surfaces provide patch panel support while punching down cables to modular inserts. The metal slots in the patch panel frame allow the work shelf to be extended for use or recessed for storage. The H3108-TB has the same functionality for rackmounted series of patch panels.

### Cable Organizer Kit — Recess-Mounted (H3108-AA)

The H3108-AA (recess-mounted) cable organizer kit is used to manage cables entering and exiting the patching area of a 19-inch (48.3 cm) rack (see Figure 3-36). For ordering information, see Table 3-27.

### Cable Organizer Kit — Flush-Mounted (H3108-EA)

The H3108-EA (flush-mounted) cable organizer kit is used to manage cables entering and exiting the patching area of a 19-inch (48.3 cm) rack (see Figure 3-36). For ordering information, see Table 3-27.

### Rackmount Cable Management Kit (H3108-CR/CS)

The H3108-CR/CS cable management kit (see Figure 3-37) manages all cables within a 19-inch (48.3 cm) rack between the active equipment and the patching system. The option provides 16 individual cable retaining rings for the orderly distribution of cables across the retaining bracket. Use H3108-CW for wall mounting. For ordering information, see Table 3-27.

### Wallmount Cable Management Bracket (H3108-CW)

The H3108-CW cable management bracket provides the same functionality as the H3108-CR, except that it can be wall or rackmounted. The H3108-CS must be ordered separately to complete the wallmount kit. It may also be used to convert the H3108-CR to a wallmounted version. For ordering information, see Table 3-27.

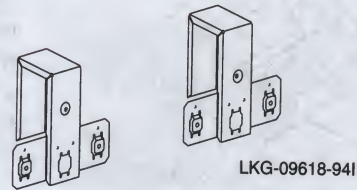
### Rack Blanking Plates (H3108-BF, H3108-BE)

Two blanking plates are available to cover 1U or 2U space openings. These plates are specially designed to allow hinged patch panels to operate without interference.



**Wall Partition Bracket (DERMS-CA)**

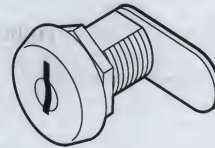
The wall partition bracket allows the DERMS-AA or -BA to be hung from modular office walls (do not exceed the manufacturer's weight specifications).



**Figure 3-39: Wall Partition Bracket for Hub (DERMS-CA)**

**Security Lock (DERMS-EA)**

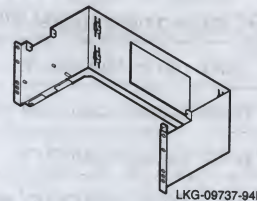
Optional lock for added wallmount security. Installs on the DERMS-DA or DEHUX-FA covers.



**Figure 3-40: Security Lock for Hub (DERMS-EA)**

**Patch Panel Wallmount Bracket (H3108-IA)**

The H3108-IA shown in Figure 3-41 is an optional mounting U bracket for the DERMS Modular Mounting System. This bracket supports a variety of patching or fiber splice systems and may be attached directly to a wall.



**Figure 3-41: Patch Panel Wallmount Bracket (H3108-IA)**

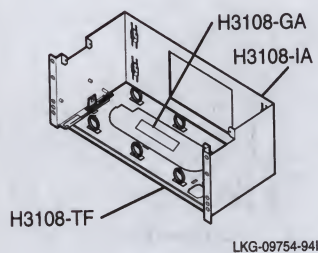
**Universal Equipment Shelf (H3108-TC)**

The universal shelf is used for mounting products that are not rackmountable. The shelf will rackmount, modular mount, or direct wallmount, and may be flipped to provide space for oversized products.



**Figure 3-42: Universal Equipment Shelf (H3108-TC)**





### Fiber Splice Tray (H3108-TF)

The H3108-TF shown in Figure 3-43 is a fiber organizer tray that slides into the H3108-IA or H3108 series of patch panel mounting components. The H3107-GA Fiber-Optic Splice Tray can be mounted with two screws, which forms a combination of a fiber-optic splice tray and a management system. Figure 3-43 shows the assembly of the H3108-IA, H3108-TF, and the H3108-GA.

Figure 3-43: Splice Fiber Tray (H3108-TF)

Table 3-27: H3108 and H3109 Series Mounting Matrix and Ordering Information

Part Number	Product Description	Type of Mounting		
		Hard Wall (Screws)	Modular	Rack
H3108-PA	48-User hinged plastic wallmount patch panel			Yes
H3108-PB	48-User hinged rackmount plastic patch panel			Yes
H3108-BB	48-User hinged metal rackmount patch panel			Yes
H3109-BB	H3108-BB hinged metal patch panel w/H3117-LA (T568A) — CAT 5			Yes
H3108-BC	48-User metal wallmount patch panel	Yes	Yes	Yes
H3109-BC	H3108-BC hinged patch panel w/H3117-LA (T568A) — CAT 5	Yes	Yes	
H3108-BD	24-User patch panel rackmount			Yes*
H3109-BD	24-User patch panel rackmount w/H3117-LA (T568A) — CAT 5			Yes*
H3108-BH	48-User patch panel rackmount			Yes*
H3109-BH	48-User patch panel rackmount w/H3117-LA (T568A) — CAT 5			Yes*
H3108-BJ	72-User patch panel rackmount			Yes*
H3109-BJ	72-User patch panel rackmount w/H3117-LA (T568A) — CAT 5			Yes*
H3108-RA	RETMA rack (wallmount)	Yes	Yes	
H3108-RB	RETMA rack (angled) wallmount	Yes	Yes	
H3108-TF	Metal tray for fiber-optic splice organizer	Yes	Yes	
H3108-TC	Universal equipment shelf	Yes	Yes	Yes
H3108-TA	Work surface patch panel wallmount	Yes	Yes	
H3108-TB	Work surface patch panel rackmount			Yes
H3108-TH	Hardware kit to mount (4) H3108-TB			
H3108-IA	Wallmount bracket for patch panels	Yes	Yes	Yes
H3108-BF	Blank plate for rack (2U)			Yes
H3108-BE	Blank plate for rack (1U)			Yes
H3108-CR	Rackmount cable management kit			Yes
*May be used with H3108-RA/RB/IA Modular Mounting options.				



Table 3-27: H3108 and H3109 Series Mounting Matrix and Ordering Information

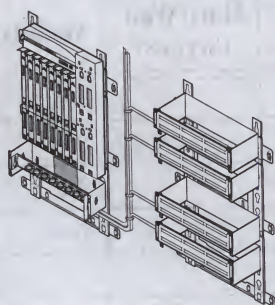
Part Number	Product Description	Type of Mounting		
		Hard Wall (Screws)	Modular	Rack
H3108-CW	Wallmount cable management bracket only		Yes	Yes
H3108-CS	Wallmount cable manager kit requires H3108-CW or CT		Yes	Yes
H3108-AA	Recess-mounted cable manager		Yes	Yes
H3108-EA	Flush-mounted cable manager		Yes	Yes
H3108-CT	Rackmount brackets for H3108-CS			
H3109-AC	Rackmounting hardware kit (20 screws and 20 U-nuts)			
H3109-AF	Cable organizer kit and mounting for stackables			
H3108-TG	Cover for H3108-IA wallmount bracket			
H9544-MS	Work group 90 mounting shelf			Yes



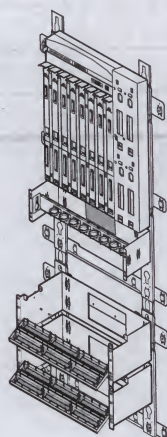
## DERMS Application Examples

### Wallmount Application

Figure 3-44 shows two different Modular Mounting System configurations incorporating the DEChub 900, H3108 patch panels, the DERMS mounting, and cable management system. The top shows the configuration of two DERMS-AAs and four H3108-PAs supporting a DEChub 900 with high density, interconnect patching (192 active ports), and cable management; the bottom shows and a configuration of a DERMS-AA and DERMS-BA with two H3108-PAs supporting a DEChub 900 with low density, interconnect patching, and cable management.



LKG-8965-941



LKG-8963-941

Figure 3-44: Modular Mounting Application Examples

### Workgroup Application

Figure 3-45 shows a work group solution using H3108-RA rack, H9544-MS tray, H3108-EA cable organizer, and H3108-PB patch panel.

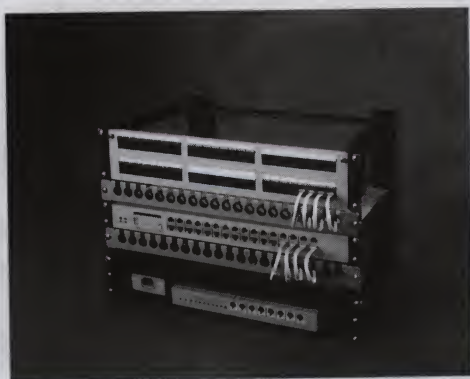


Figure 3-45: Work group Solution



### Workgroup 90 Single Module Tray

Figure 3-46 shows a DEChub 90 single module mounted on a H9544-MS tray, used for 19-inch (48.3 cm) rackmounting.



Figure 3-46: Workgroup 90 Single Module Tray

### Fiber-Optic Distribution Module

Figure 3-47 shows an alternative fiber-optic distribution and splicing unit. This unit comprises the following products: H3108-IA bracket, H3108-TF tray, H3108-TG cover, H3107-GA splice organizer, H3108-PB patch panel with ST and SC fiber modules, and H3108-EA cable organizer. Universal fiber splices and pigtail cables are also shown.



Figure 3-47: Fiber-Optic Distribution Module

### Passive Wiring Kit for Stackable Hubs (H3109-EA)

The H3109-EA provides a basic structure wiring center to facilitate the integration of stackable hubs into the building wiring infrastructure. This kit contains wallmounting bracket, patch panel with 16 Category 5 ports (expands to 48 ports), work surface, 16 UTP patch cords, and all mounting hardware.

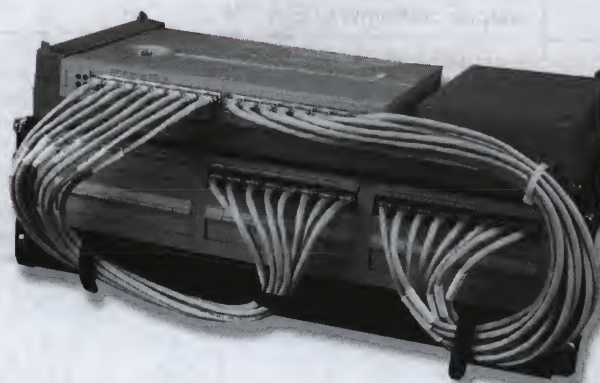
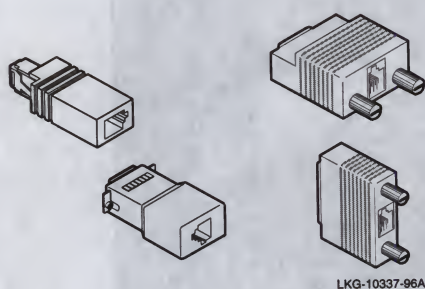


Figure 3-48: Passive Wiring Kit Shown with Stackable Hubs



## Tools — Adapters



**Figure 3-49: Adapters**

### Features

- Integral EOS/ESD protection
- Easy to use
- Overmolded
- Overvoltage protection

**Table 3-28: Adapters Ordering Information**

Adapter	Description
H8575-A	MMJ to 25-way, female, filtered D-type with jack screws for mating to a device's (male) connector
H8575-B	MMJ to 9-way, female, filtered D-type with jack screws for mating to the 9-way (male) printer port of an early DIGITAL terminal
H8571-C	MMJ to 25-way, male, unfiltered D-type with mounting nuts for securing to cables such as the BC22D which has female connectors
H8575-D	MMJ to 25-way, male, filtered D-type with jack screws for possible connection to a RS232 modem when used with a BC16E cable
H8575-E	MMJ to 25-way, male, filtered D-type with jack screws for connection to LJ250 color printers. Also suitable for adapting non-DIGITAL printers, and have a female port
H8571-J	MMJ to 9-way, female, filtered D-type with jack screws for mating to PC-style 9-pin (male) port. This adapter conforms to EIA-574
H8584-AC	8-pin MP to 6-pin MMJ adapter
H8585-AA	8-pin MP to DB9 null-modem adapter
H8585-AB	8-pin MP to DB25 modem adapter
H8585-AC	8-pin MP to DB25 modem adapter
H8853-AA	Male to female D-sub adapter with EOS/ESD protection

The adapters shown in Figure 3-49 are used on active equipment including workstations, personal computers, and servers to provide translation from one connector type to another connector type. Some adapters contain electrostatic suppression devices and overvoltage protection. This protects the active equipment to which the adapter is attached.

For pin-out information and wiring diagram see Appendix A. See Table 3-28 for ordering information.



## Tools — Fiber

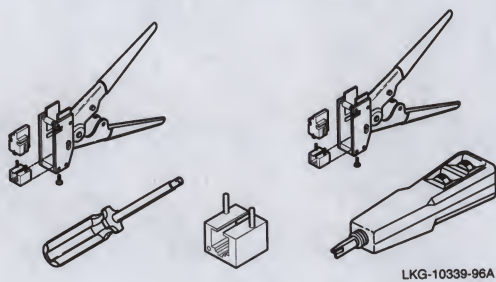
The OPEN DECconnect system supplies a variety of fiber LAN installation tools. These tools help the installer implement a quick and reliable network. The tool kits provide the tools and supplies necessary to terminate SC- and ST-type connectors recommended by the OPEN DECconnect Structured Wiring System. See Table 3-29 for ordering information.

**Table 3-29: Fiber Tools Ordering Information**

Part Number	Description
H3114-FD	Fiber splice tool kit. This kit includes: bottle of cleaning alcohol; 80 pipe cleaners; 100 lint-free cloths; base and tool hardware; cleaved fiber inspection magnifier; scissors; cable stripper; no-nik fiber stripper; industrial applicator with coupling gel and dispensing tip; cleaving tool; mandrel tool; instruction manual
H8102-AD	ST/SC HOT MELT (110V). This kit contains all the tools and accessories necessary to assemble the ST/SC HOT MELT connector. The oven associated with this kit is 110V
H8102-AE	ST/SC HOT MELT (220V). This kit contains all the tools and accessories necessary to assemble the ST/SC HOT MELT connector. The oven associated with this kit is 220V
H8102-AJ	Fibrok splicing kit. Use with H3114-FS universal optical fiber splice
H8102-AK	One-step lapping film for HOT MELT polishing film
H8102-AL	One-step lapping film for H8102-AM. The H8102-AL one-step lapping film is a HOT MELT polishing film for the H8102-AM HOT MELT Polisher
H8102-AM	HOT MELT polisher for use in polishing the ferrule of any HOT MELT connector. A 110-volt adapter is provided. A 220-volt universal adapter must be purchased locally
H8102-AN	SC adapter for polisher for the H8102-AM HOT MELT Polisher



Tools — UTP and ScTP



OPEN DECconnect supplies a selection of twisted pair tools for field terminating and connectorizing UTP and ScTP building wire and stranded patch cord.

Figure 3-50: UTP and ScTP Tools

Features

- 8-pin and 6-pin crimping
- MJ or MMJ
- 110 punchdown tool

Table 3-30: UTP and ScTP Tools Ordering Information

Part Number	Description
H8100-C	110 punchdown tool with 110 blade
H8100-D	Small barrel punchdown tool
H8100-F	8-pin replacement crimp die set for H8100-G or H8241 crimp tool
H8100-G	8-pin crimp tool and die set
H8241	6-pin MMP crimp tool



## Tools — Coaxial

OPEN DECconnect supplies a full set of tools to terminate ThinWire or thick wire cable and connectors. See Figure 3-51. The H8100-A/B ThinWire strippers are used to remove the jacket and trim back the insulation to the correct dimensions. There are two coax stripping tools, one for PVC and one for plenum cable. See Table 3-31 for ordering information.

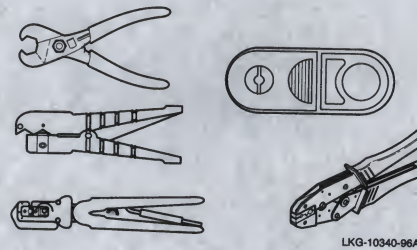


Figure 3-51: Coaxial Tools

### Features

- Easy to use
- Reliable
- Both PVC and plenum strippers

Table 3-31: Coaxial Tools Ordering Information

Part Number	Description
29-24662	Transceiver cable ferrule crimp tool and die set
29-24667	802.3/thick wire cable cutter
29-24668	802.3/thick wire cable stripper
H8100-A	ThinWire stripper tool for plenum-rated ThinWire cable
H8100-B	ThinWire stripper tool for PVC ThinWire cable
H8100-E	ThinWire cable crimp tool







## **Applications/Configurations for Active and Passive Components**

This chapter provides technical information about applications and configurations for DIGITAL's DEChub platforms, and associated LAN and WAN networking products.







## Connecting Active Equipment to the Wiring System

---

The OPEN DECconnect cabling system connects active network products in a multivendor environment. The Physical layer network can be as large as a full campus area or as simple as an isolated or independent work group.

The media options supported by OPEN DECconnect include all media types:

- Unshielded twisted-pair (UTP)
- Screened twisted-pair (ScTP)
- Fiber-optic cabling
- Coaxial cabling

Figure 4-1 illustrates the integration of the OPEN DECconnect cabling/modular mounting system with the DEChub 90 active equipment product set. This wiring scheme provides a variety of LAN connectivity solutions for the horizontal and backbone distribution subsystems. See page 4-11 for a list of hub-supported products.

Figure 4-2 illustrates the integration of the OPEN DECconnect cabling/modular mounting system with the DIGITAL MultiSwitch 900 and supported modular active equipment product set. This wiring scheme provides a variety of LAN connectivity solutions for the horizontal and backbone distribution subsystems. See page 4-12 for a list of DIGITAL MultiSwitch 900 hub-supported products.

Figure 4-3 illustrates the integration of the OPEN DECconnect cabling/modular mounting system with the DIGITAL MultiStack RackPack and supported modular active equipment product set to support a 10BaseT work group with local patching. This wiring scheme provides a variety of LAN connectivity solutions for the horizontal and backbone distribution subsystems. Illustrations for connecting selected equipment to the cabling system appear later in this section. Tables associated with these illustrations provide a parts breakdown of all necessary components to support the end-to-end connectivity of the selected application; page references point to the locations of complete product descriptions. Wiring diagrams provide a complete pin-to-pin path for the application that is connected to the OPEN DECconnect cabling/Modular Mounting System (DERMS).

All application/configuration illustrations are examples only. Implementation will vary according to specific customer requirements.

### Note

**For detailed descriptions of the following networking products and platforms, see the *Network Products Guide*, EC-I7940-42.**



The OPEN DECconnect wiring components and modular mounting system, in conjunction with the WorkGroup DEChub 90 backplane and applications modules form an integrated system.

This integrated system provides the user with an unmatched combination of features to support work group computing.

**These features include**

- **Compact, space-saving components that are aesthetically compatible with the office environment and tough enough for the wiring closet**
- **Industry-standard wiring solutions that support many applications and provide high levels of design modularity and flexibility**
- **Powerful and varied applications provided at low cost and guaranteed compatible with the wiring system**



The OPEN DECconnect system provides full product support for all media types including unshielded and screened twisted pair, ThinWire coaxial cable, and fiber.

The OPEN DECconnect H3111 family of modular faceplates support up to four snap-in connectors. A variety of connectors supporting data, phone, or video applications are available.



DSRVG  
LAT Terminal Server

DSRVE  
Multiprotocol Server

DECMR 10Base2  
Repeater

DEWGB Workgroup  
Bridge

DEMFR 10BaseFL  
Multiport Repeater

DEWGF  
Fiber Bridge

DSRZF Remote  
Terminal Server

DETM1 10BaseT  
Repeater

DENMA SNMP  
Management

DEWAR  
Multiprotocol Router

DEFAR 10Base  
FL/AUI

DETMR 10BaseT  
Repeater

DSRVD Terminal  
Server

DEWBR  
Multiprotocol Brouter

DSRVH  
Communications Server

DEFM1  
Fiber Repeater

DECserver 90L

DECserver 90M

DECserver 90FS

The OPEN DECconnect H3117 family of snap-in patch panel inserts provide modularity, flexibility, and connectivity for twisted-pair, both shielded and unshielded, ThinWire, or fiber. These inserts can be mixed within a single patch panel.



To building backbone

## WorkGroup modules include

The **DERMS-FA** provides an inexpensive, space-saving solution to wire management and security for the work group, integrating the active equipment and the passive wiring.

The DEChub backplane provides a multifunction, multimedia platform that supports a mixture of work group application modules. All WorkGroup modules are forward compatible to the DIGITAL MultiSwitch 900.



The OPEN DECconnect wiring components and modular mounting system, in conjunction with the DIGITAL MultiSwitch 900 backplane and applications modules form an integrated system.

This integrated system provides the user with an unmatched combination of features to support work group computing.

***These features include***

- ***Compact, space-saving components that are aesthetically compatible with the office environment and tough enough for the wiring closet***
- ***Industry-standard wiring solutions that support many applications and provide high levels of design modularity and flexibility***
- ***Powerful and varied applications provided at low cost and guaranteed compatible with the wiring system***
- ***Supports multiple technologies through the flexible backplane interconnect***
- ***Provides redundant power supplies***



The OPEN DECconnect system provides full product support for all media types including unshielded and screened twisted pair, ThinWire coaxial cable, and fiber.

The OPEN DECconnect H3111 family of modular faceplates support up to four snap-in connectors. A variety of connectors supporting data, phone, or video applications are available.



## DIGITAL MultiSwitch 900 modules

The **DERMS-FA** provides an inexpensive, space-saving solution to wire management and security for the work group, integrating the active equipment and the passive wiring.

DETTM 10BaseT Repeater

DETTM Multiport 10BaseT Repeater

DSRVZ Communications Server

DEF6M FDDI Concentrator

DEFMM Fiber Repeater

DEFBA 10/100 FDDI Switch

DESBF Personal Ethernet FDDI Switch

DEBMP Ethernet Switch

DTROS Token Ring Repeater STP

DTROR Token Ring Repeater UTP

DERMN Ethernet Network Monitor

DTMAU Token Ring MAU

DTRMN Token Ring Network Monitor

The DIGITAL MultiSwitch 900 backplane provides a multifunction, multimedia platform that supports a mixture of both DEChub 90 and DIGITAL MultiSwitch 900 modules.

The OPEN DECconnect H3117 family of snap-in patch panel inserts provide modularity, flexibility, and connectivity for twisted-pair, both shielded and unshielded, ThinWire, or fiber. These inserts can be mixed within a single patch panel.



To building backbone



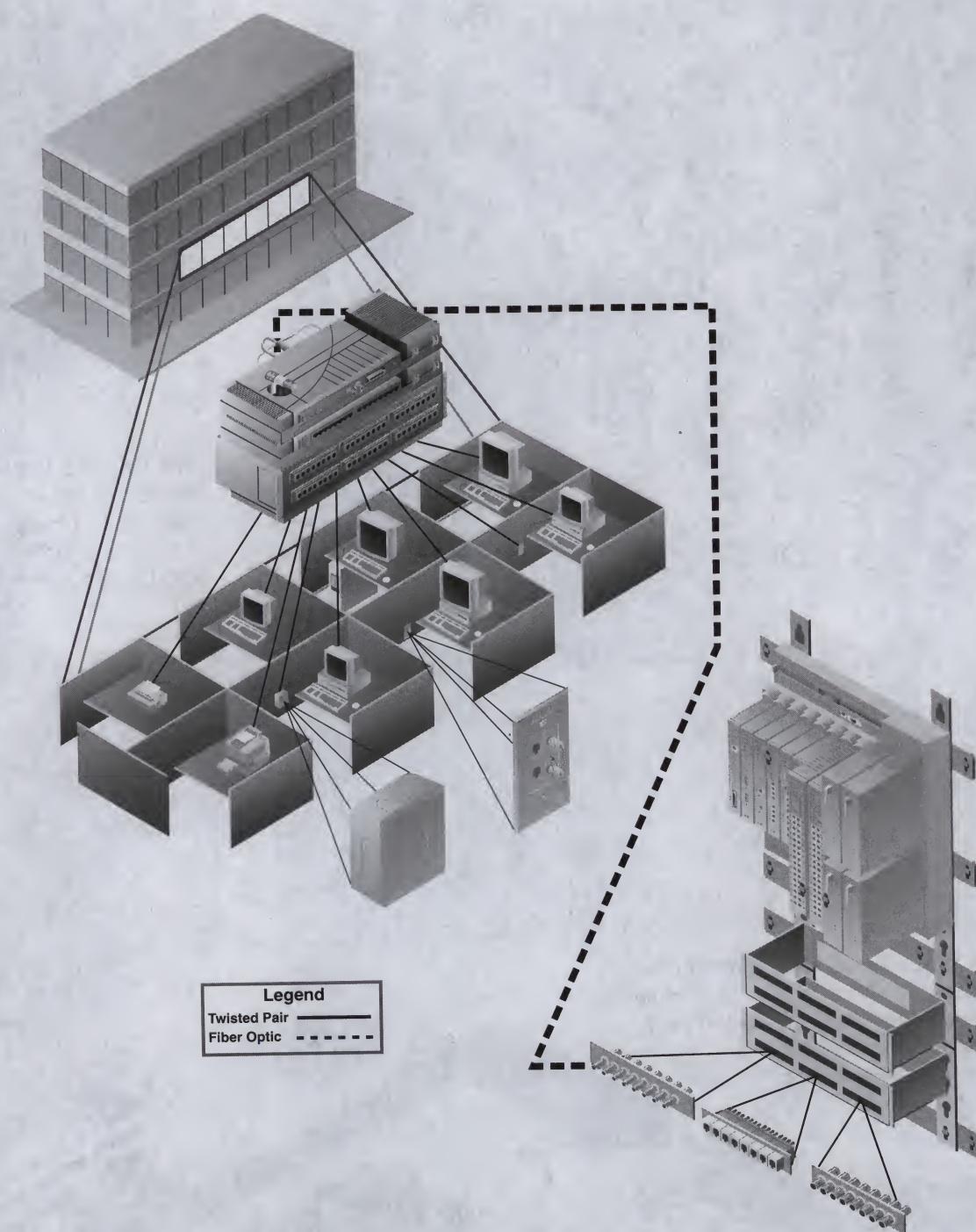


Figure 4-3: MultiStack RackPack



## DEChub Platforms

DIGITAL provides several platforms, the:

- DIGITAL MultiSwitch 900 (formerly the DEChub 900 MultiSwitch)
- DEChub 90 Multifunction 802.3/Ethernet Backplane
- DIGITAL MultiStack System
- DEChub ONE-MX
- DEChub ONE

These products offer innovative and cost-saving solutions to the rising demand for low-cost, highly functional, stackable, and chassis-based networking products.

The flexibility inherent in these products' design enables them to be deployed throughout various work groups and remote offices, wiring closets, or in data centers as they are needed.

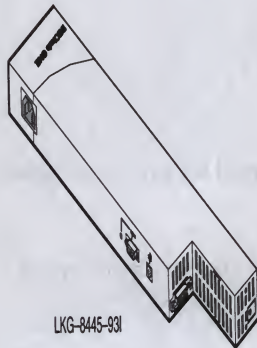
These products provide several major advantages.

- **Flexible Configuration.** Unique to the industry, every product in the DEChub and MultiStack family is modular. These products can be installed and managed as an individual, standalone device on the network, or as part of a multislot hub configuration. DEChub products also make it quick and easy to switch connections among multiple LAN technologies, modules, or user segments within the hub, without disrupting users. In addition, shared bandwidth networks such as Ethernet or FDDI can be reconfigured into multiple, independent LAN segments for maximum network availability, without the associated costs of installing higher bandwidth technologies.
- **High-performance Network Access.** The DIGITAL MultiSwitch 900 is a high-performance enterprise hub with a technology-independent backplane. That means Ethernet, Token Ring, FDDI, ATM, and Fast Ethernet can all run on the same 3 Gb/s hub backplane. The DEChub 900 MultiSwitch supports many bus-, ring-, and cell-based connections in many combinations within a single hub. Support for high throughput allows for the implementation of emerging higher bandwidth technologies such as ATM and Fast Ethernet.
- **Reliable, Secure Performance.** The ability to configure redundant power supplies allows for load sharing and automatic failover if a power supply fails. Some DEChub products can even be configured to provide automatic link redundancy and failover if an individual connection is disrupted.
- **Powerful Network Management.** DIGITAL's SNMP-based management approach, combined with DIGITAL's *clearVISN* software, ensures that each network component can be monitored and controlled effectively. In addition, DIGITAL supports the integration of these diverse components within a modular management scheme, allowing network managers to scale investments as networks grow.
- **Ease of Use.** An intuitive graphical user interface provides powerful control of the network while minimizing training and support costs.
- **Cost Effectiveness.** The modular design and plug-and-play functionality provide the lowest cost for accommodating users' moves, adds, and changes.
- **Investment Protection.** In the stacking configurations, the products provide a broad range of LAN and WAN functionality for work groups or small sites. These same products can also be used in the department-oriented DEChub 90 chassis or the high-performance DIGITAL MultiSwitch 900 enterprise hub.



## DEChub 90 Platforms

### DIGITAL MultiSwitch 900



**Figure 4-4: DIGITAL MultiSwitch 900 (DMHUB-BA)**

The DIGITAL MultiSwitch 900, with either DEChub 90 or DIGITAL MultiSwitch 900 series modules installed, becomes an integral part of any distribution subsystem within a structured wiring environment. Figure 4-4 shows the DIGITAL MultiSwitch 900.

The DIGITAL MultiSwitch 900 chassis is a multitechnology hub that supports simple LAN connectivity to high-speed switching. It offers high-performance network access, flexible configuration, superior network management, and security.

It is a high-performance enterprise hub with a technology-independent backplane. This means that Ethernet, Token Ring, FDDI, and ATM can all run on the same backplane. The hub supports many bus-, ring-, and cell-based connections in many combinations. Support for high throughput allows for the implementation of higher bandwidth technologies such as ATM.

The DEChub 900 supports up to eight network modules, commonly referred to as full-height modules. Additionally, the hub also supports half-height modules. The DEChub 900 integral hub management agent can manage a DECpeater 90 without a DECagent 90. The DIGITAL MultiSwitch 900 does require an installed module to act as an IP services module.

Up to four power supply modules can be installed in the DEChub 900. That is enough power to support most configurations with redundancy. This ensures that the hub continues to operate without interruption even if one of the power modules should fail. If a power module should fail, the module can be hot swapped without powering down the hub.

#### Features

- Provides bandwidth on demand with an aggregate throughput of more than 3 Gb/s and a total of 18 LAN channels.
- Supports multiple bus-, ring-, and cell-based connections in a multitude of combinations (Ethernet, Token Ring, FDDI, and ATM).
- Supports one ThinWire Ethernet, two Token Rings, and one flexible channel on the upper (48-pin) connector.
- Supports 14 flexible channels on the lower (160-pin) connector.
- Supports software reconfigurable connections among multiple technologies and across 14 flexible network channels.
- Provides an open hardware architecture. No configuration restrictions or slot dependence.
- Contains redundant power supplies (up to four supplies). Provides true hot-swap, load sharing, and redundancy to prevent power-related problems, and power module failures from taking down the network.



## DEChub Platforms

The DIGITAL MultiSwitch 900 supports the following networking modules:

### Note

For detailed descriptions, see the *Network Products Guide, EC-I7940-42*.

- DECwanrouter 90
- DECwanrouter 90-E
- DECagent 90
- PEs switch 900TX
- DECswitch 900EE
- DECswitch 900EF
- DECswitch 900ET
- DECswitch 900FO
- PORTswitch 900FP
- PORTswitch 900TP
- PORTswitch 900CP
- DECbridge 90
- DECbridge 90FL
- DECpacketprobe 90
- DECpacketprobe 900RR
- DECbrouter 90
- DECbrouter 90-T1
- DECbrouter 90-T2
- DECbrouter 90-T2A
- DECrepeater 90FA
- DECrepeater 900TM
- DECrepeater 900GM
- DECrepeater 900TL
- DECrepeater 900SL
- DECrepeater 90-T16
- DECrepeater 90FL
- DECrepeater 90FS
- DECrepeater 90TS
- DECrepeater 90T+
- DECrepeater 90C
- DECserver 900TM
- DECserver 90M
- DECserver 90TL+
- DECserver 90TL
- DECserver 900GM
- DECmau 900TL
- DECconcentrator 900MX
- DECconcentrator 900TH
- DECconcentrator 900EF
- RoamAbout Access Point
- RouteAbout Access EI
- RouteAbout Central EW

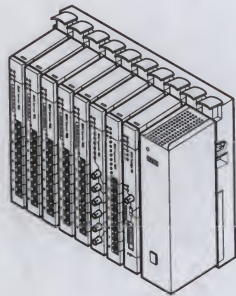
## Hub Manager

The Hub Manager is a microprocessor-based controller used to monitor, configure, and control the DIGITAL MultiSwitch 900. It is an integral part of the DIGITAL MultiSwitch 900 backplane. Using either remote management control or default local control, the Hub Manager provides a central control point for DEChub networks and installed modules. It also allocates hub resources to installed modules and has the following functions:

- Responds to Simple Network Management Protocol (SNMP) queries for statistics about the hub (chassis MIB)
- Maps the slots to which modules are inserted
- Identifies media access control (MAC) and internet protocol (IP) addresses of modules for direct in-band communication from the network management station
- Performs insertion and removal of Token Ring modules on the DIGITAL MultiSwitch 900 chassis
- Provides power management
- Supports intermodule configuration
- Provides status of network modules and power supply modules
- Supports local status using a liquid crystal display (LCD)
- Provides a setup port for hub initialization
- Provides an out-of-band management (OBM) port
- Provides management agent for DEChub 90 repeaters



## DEChub Platforms



LKG-05290-911

**Figure 4-5: DEChub 90 Multifunction 802.3/Ethernet Backplane (DEHUB-BA)**

### DEChub 90 Backplane

The DEChub 90 chassis is a stackable and hub-based solution in one product. It supports the communication needs of small to mid-size work groups. Figure 4-5 shows the DEChub 90 backplane.

Built as a multifunctional Ethernet-based backplane, the DEChub 90 chassis provides mounting, power, and backplane ThinWire Ethernet connection to accommodate up to eight Min modules. These modules include repeaters, network access servers, bridges, and wide area routers. Network management capability is provided by the DECagent 90 (a management agent) and SNMP-based network management software.

The DEChub 90 chassis features an integral BNC port for connecting the hub to a ThinWire Ethernet backbone. Any DEChub 90 configuration that includes a DECbridge 90 or a DECrepeater 90FA network module can connect to the Ethernet backbone using the standard AUI connector on the bridge or repeater. Two DEChub 90 chassis can be interconnected using the BNC port to create a 16-slot hub, which can operate and be managed as a single entity.

### Features

- Supports industry and de facto standards for seamless connection of DEChub products to non-DIGITAL networks
- Provides plug-and-play functionality
- Allows hot swap module replacement
- Features a rich variety of module functionality including repeater and bridge fiber-optic support and wide area routing, which permits links from the work group to other remote groups
- Offers an easy migration path for scalable growth from the DEChub 90 chassis or DIGITAL MultiStack System, to the DIGITAL MultiSwitch 900 enterprise hub

The DEChub 90 supports the following networking modules:

- |                          |                      |
|--------------------------|----------------------|
| • RoamAbout Access Point | • DECrepeater 90-T16 |
| • DECwanrouter 90        | • DECrepeater 90FS   |
| • DECwanrouter 90-E      | • DECrepeater 90TS   |
| • DECagent 90            | • DECrepeater 90FL   |
| • DECbridge 90FL         | • DECrepeater 90FA   |
| • DECpacketprobe 90      | • DECrepeater 90T+   |
| • DECbrouter 90          | • DECrepeater 90C    |
| • DECbrouter 90-T1       | • DECserver 90M      |
| • DECbrouter 90-T2       | • DECserver 90TL+    |
| • DECbrouter 90-T2A      | • DECserver 90TL     |
| • DECbridge 90           |                      |



## DEChub Platforms



**Figure 4-6: DIGITAL MultiStack System**

### DIGITAL MultiStack System

The DIGITAL MultiStack System shown in Figure 4-6 is a stackable hub system that allows repeaters, internetworking systems, wireless devices, LAN monitoring, and management modules to be used and managed in stackable network configurations. The DIGITAL MultiStack System can stack up to 16 modules, commonly referred to as half-height modules. It can be rackmounted in a standard 19-inch rack, or distributed throughout a building.

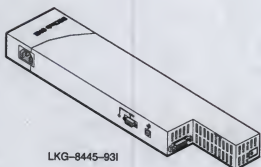
In the DIGITAL MultiStack System, 16 network modules can be managed as a single SNMP management domain using network management software. In addition, the same network modules are easily removed from the DIGITAL MultiStack System for use in a DEChub 90 or DEChub 900 system.

The DIGITAL MultiStack System supports and provides hot-swap capability for any module in a stacking unit. The stacking unit comes complete with a stackable backplane, power supply, ThinWire, and UTP management cables.

An optional AUI interface is available for the DECRepeater 90T-16 to facilitate connections to a network backbone. Because the DIGITAL MultiStack System integrates SNMP management through a separate management channel, it ensures management access by maintaining a continuously available management connection, even if a connection is lost to one of the stackable hubs.

### Features

- Flexible, hot-swappable stackable hub system for small work groups up to switched enterprise networks. Provides everything needed to build stackable networks quickly and cost effectively. Allows incremental growth and increases network availability. Easy-to-use stackable system saves in network design and installation costs
- Scales up to 232 managed ports in a single management domain. Lowers overall network equipment costs. Provides investment protection as network requirements grow
- Supports SNMP management for up to 16 stackable modules. Unique management cabling ensures continuous management up time. Can use low-cost, Windows-based network management tool to build and manage networks
- Provides low-cost, high-speed connections to network backbones
- Provides lifetime investment protection. Stackable hubs can be mounted in an OPEN DECconnect Modular Mounting System standard 19-inch rack quickly and easily. The same modular hubs migrate forward to chassis-based configurations for cable management or integration with multiple technologies
- Configuration flexibility. These hub modules work in a stack, in a rack, in a hub chassis, or standalone



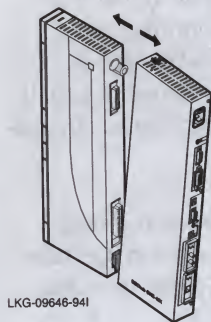
**Figure 4-7: DEChub ONE**

### DEChub ONE

The DEChub ONE is a single-slot Ethernet hub for use with DIGITAL MultiSwitch 900 modules to provide standalone operation. The DEChub ONE provides power for the attached DIGITAL MultiSwitch 900 module and an AUI port that can be used to connect to a standard Ethernet backbone. Optional medium attachment units (MAUs) can be used with the DEChub ONE to convert from the AUI to fiber-optic, ThinWire, or twisted-pair media for connections to a backbone using these media.



## DEChub Platforms



**Figure 4-8: DEChub ONE-MX**

### DEChub ONE-MX

The DEChub ONE-MX docking station is a single-slot hub that provides 90 watts of standalone or redundant, dc power for DEChub 900 full-height modules. The DEChub ONE-MX exceeds all functions of the previous DEChub ONE. An AUI on the docking station can be used to connect an attached module to a standard Ethernet LAN. Using DIGITAL's optional MAU, the docking station can adapt an attached module to a fiber-optic, ThinWire, or twisted-pair LAN connection. Through use of DIGITAL's optional single-mode fiber (SMF), multimode fiber (MMF) or twisted-pair (TP) ModPMDs, the docking station can connect to an FDDI network via its A, B, M, or S ports.

The DEChub ONE-MX supports tabletop and rack mounting. By stacking DEChub ONE-MX single-slot hubs in 19-inch racks, users can configure the DEChub 900 modules to support their current needs in a small LAN and use the same products to upgrade to enterprisewide networks as their LAN use grows.

### clearVISN Overview

*clearVISN* software is a flexible, network management application with a graphical user interface (GUI). It manages network modules installed in a hub and the hub itself. *clearVISN* also manages other network devices such as GIGAswitch.

To communicate management commands to the network modules, *clearVISN* sends SNMP commands to SNMP management agents on the network modules or on the hub itself. This software is used to manage:

- A DEChub 90 and its network modules
- A DIGITAL MultiSwitch 900 and its network modules
- Individual standalone modules such as the DECrepeaters 90FS and DECrepeaters 90TS
- Standalone modules installed in a DEChub ONE or DEChub ONE-MX
- A GIGAswitch



## DEChub Platforms

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### *Supported Modules List*

*clearVISN* software manages the following network modules:

- RoamAbout Access Point
- DECagent 90
- Brouter modules
  - DECbrouter 90T1
  - DECbrouter 90T2
  - DECbrouter 90T2A
- Bridge modules
  - DECbridge 90
  - DECbridge 90FL
  - DECbridge 900MX
- Switch modules
  - DECswitch 900EE
  - DECswitch 900EF
  - PESwitch 900TX
  - DECswitch 900FO
- RoamAbout Access Point module
- GIGAswitch (with V4 on Windows)
- DECconcentrator 900MX
- Repeater modules
  - DECrepeater 90C
  - DECrepeater 90FA
  - DECrepeater 90FL
  - DECrepeater 90T
  - DECrepeater 90T+
  - DECrepeater 90TS
  - DECrepeater 900TM
  - DECrepeater 900GM
  - DECrepeater 90T-16
  - PORTswitch 900CP
  - PORTswitch 900FP
  - PORTswitch 900TP
- Remote Access Server modules
  - DECserver 90L
  - DECserver 90L+
  - DECserver 90M
  - DECserver 90TL
  - DECserver 900TM
  - DECserver 900GM

### *More Modules*

You can also use *clearVISN* to display the DECmau 900TL, DECmau 90TH, DECrepeater 900FL, DECrepeater 900SL, DECrepeater 900TL, DECpacketprobe, and DECwanrouter 90 modules. *clearVISN* recognizes and displays these modules in the hub front panel window, but it does not allow you to manage them.



1. The first step is to determine the required power level for the application. This is typically done by calculating the power dissipation of the components and comparing it to the power handling capabilities of the components.

2. The second step is to select the appropriate components based on the required power level. This involves choosing components that can handle the required power without overheating or failing.

3. The third step is to design the circuit to ensure proper power distribution and protection. This may involve using current limiting resistors, fuses, or other protective devices.

4. The fourth step is to test the circuit to verify that it is operating correctly and safely. This involves measuring the power dissipation and other parameters to ensure that the components are within their rated limits.

5. The fifth step is to document the design and test results. This includes creating a schematic diagram, a bill of materials, and a test report.

6. The sixth step is to implement the design and test results. This involves building the circuit and testing it to ensure that it meets the required specifications.

7. The seventh step is to evaluate the performance of the circuit. This involves comparing the test results to the design requirements and making any necessary adjustments.

8. The eighth step is to optimize the circuit for cost and performance. This involves selecting components that are both reliable and cost-effective.

9. The ninth step is to finalize the design and test results. This involves creating a final schematic diagram, a bill of materials, and a test report.

10. The tenth step is to implement the final design and test results. This involves building the circuit and testing it to ensure that it meets the required specifications.

11. The eleventh step is to evaluate the performance of the circuit. This involves comparing the test results to the design requirements and making any necessary adjustments.

12. The twelfth step is to optimize the circuit for cost and performance. This involves selecting components that are both reliable and cost-effective.

13. The thirteenth step is to finalize the design and test results. This involves creating a final schematic diagram, a bill of materials, and a test report.

14. The fourteenth step is to implement the final design and test results. This involves building the circuit and testing it to ensure that it meets the required specifications.

15. The fifteenth step is to evaluate the performance of the circuit. This involves comparing the test results to the design requirements and making any necessary adjustments.

16. The sixteenth step is to optimize the circuit for cost and performance. This involves selecting components that are both reliable and cost-effective.

17. The seventeenth step is to finalize the design and test results. This involves creating a final schematic diagram, a bill of materials, and a test report.

18. The eighteenth step is to implement the final design and test results. This involves building the circuit and testing it to ensure that it meets the required specifications.

19. The nineteenth step is to evaluate the performance of the circuit. This involves comparing the test results to the design requirements and making any necessary adjustments.

20. The twentieth step is to optimize the circuit for cost and performance. This involves selecting components that are both reliable and cost-effective.

21. The twenty-first step is to finalize the design and test results. This involves creating a final schematic diagram, a bill of materials, and a test report.

22. The twenty-second step is to implement the final design and test results. This involves building the circuit and testing it to ensure that it meets the required specifications.

23. The twenty-third step is to evaluate the performance of the circuit. This involves comparing the test results to the design requirements and making any necessary adjustments.

24. The twenty-fourth step is to optimize the circuit for cost and performance. This involves selecting components that are both reliable and cost-effective.

25. The twenty-fifth step is to finalize the design and test results. This involves creating a final schematic diagram, a bill of materials, and a test report.



## DEChub Platforms

### Administration Subsystem

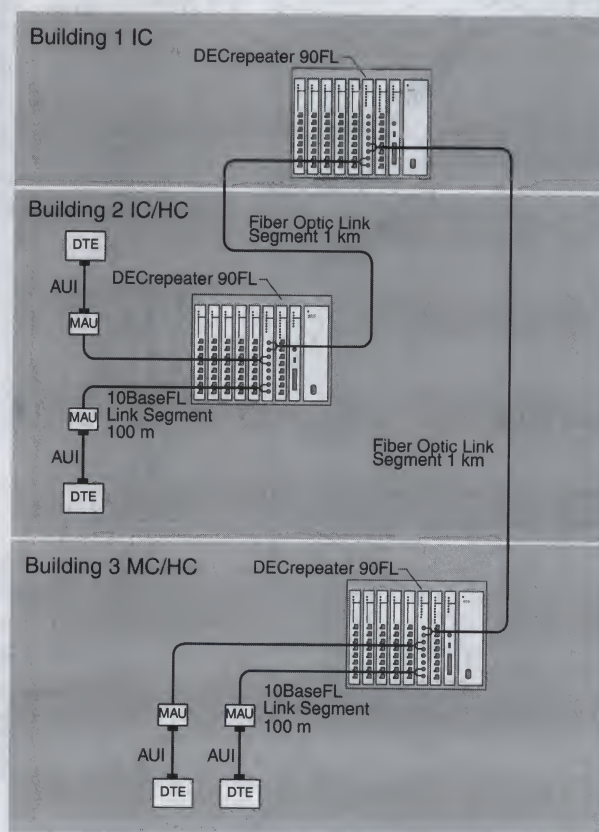
This subsystem includes the cross-connects and interconnects used to connect the four distribution subsystems. It allows administration of the structured wiring to various parts of a building as needs change.

### DEChub Configurations

A DEChub backplane provides a common chassis or platform that supports multiple application modules. DEChub products allow network managers to quickly and easily provide the work group with the applications it requires. Services can be added, changed, or moved without disruption to the network or users.

Figure 4-9 shows a typical configuration of a DEChub 90 or a DEChub 900 for a campus installation with three buildings: two of the buildings contain intermediate cross-connects (ICs) and the third contains the main cross-connects (MC).

Figure 4-10 shows a typical installation of a building network integrating DEChub 90, DIGITAL MultiSwitch 900, and MultiStack platforms. As shown, the network supports an Ethernet LAN and a Token Ring LAN.

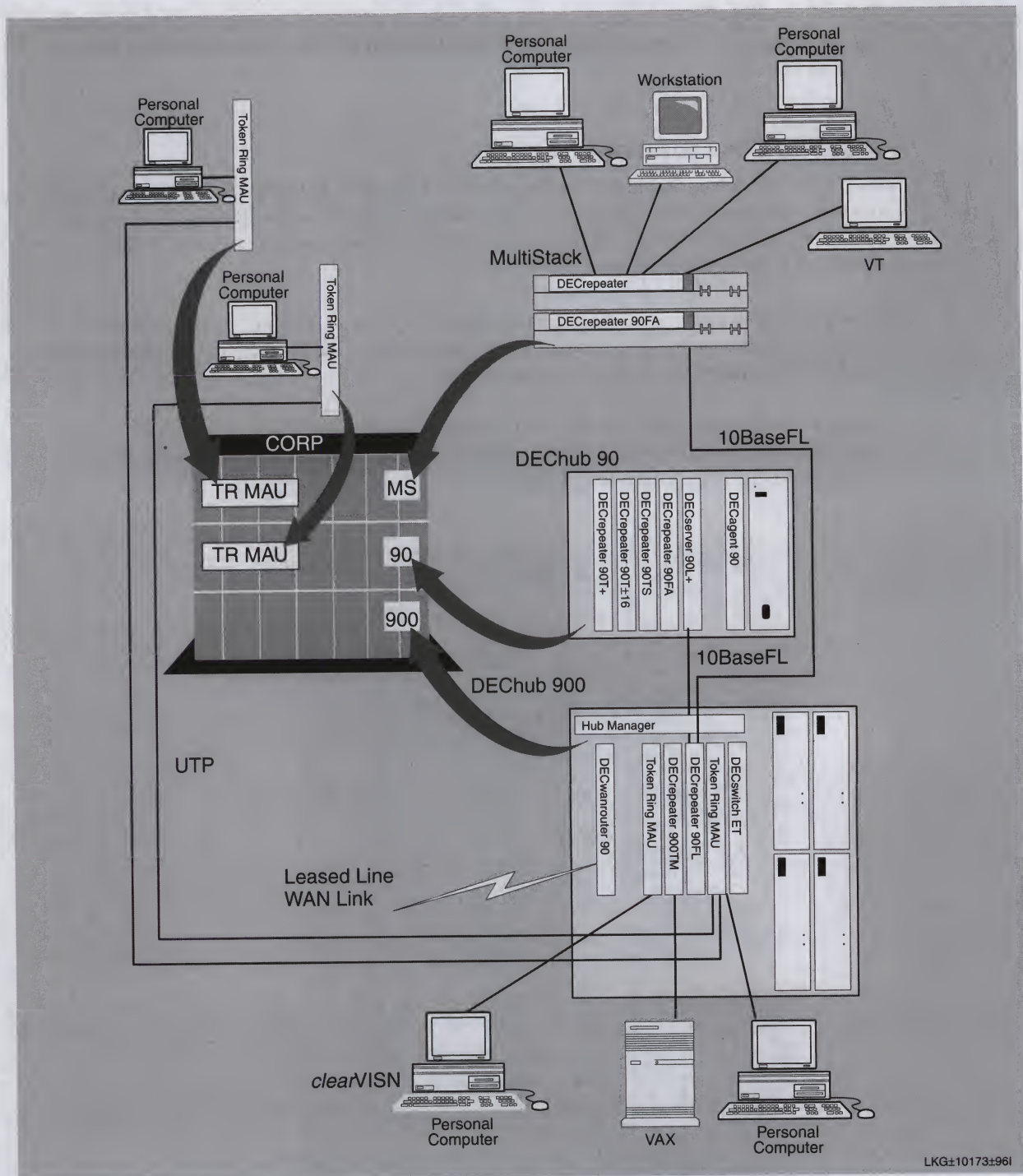


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Figure 4-9: Hub Configuration for Campus Backbone Subsystem with Fiber Backbone



## DEChub Platforms



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**Figure 4-10: Token Ring/Ethernet Building Network Implementation with DIGITAL MultiSwitch 900, DEChub 90, and MultiStack Platforms**



## **Local Area Network Applications**

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Local area networks are the basic units for all networked computing systems, and they can move information within a defined geographic area. LANs are composed of physical connections consisting of hardware or communications boards, cables, and software.

DIGITAL provides a full line of networking products that use passive building wiring to create local or wide area networks. LANs allow users at the desktop to access the full computing power of the organization through distributed processing.

This section illustrates the applications and configurations for 802.3/Ethernet active networking components. The application configuration drawing for selected components includes, where applicable, a configuration diagram and a part number table. The table describes the specific product and where to find ordering information.

### **Note**

**Except where specifically stated in the following applications, DEChub refers to either the MultiStack, DEChub 90, or DIGITAL MultiSwitch 900 platforms.**



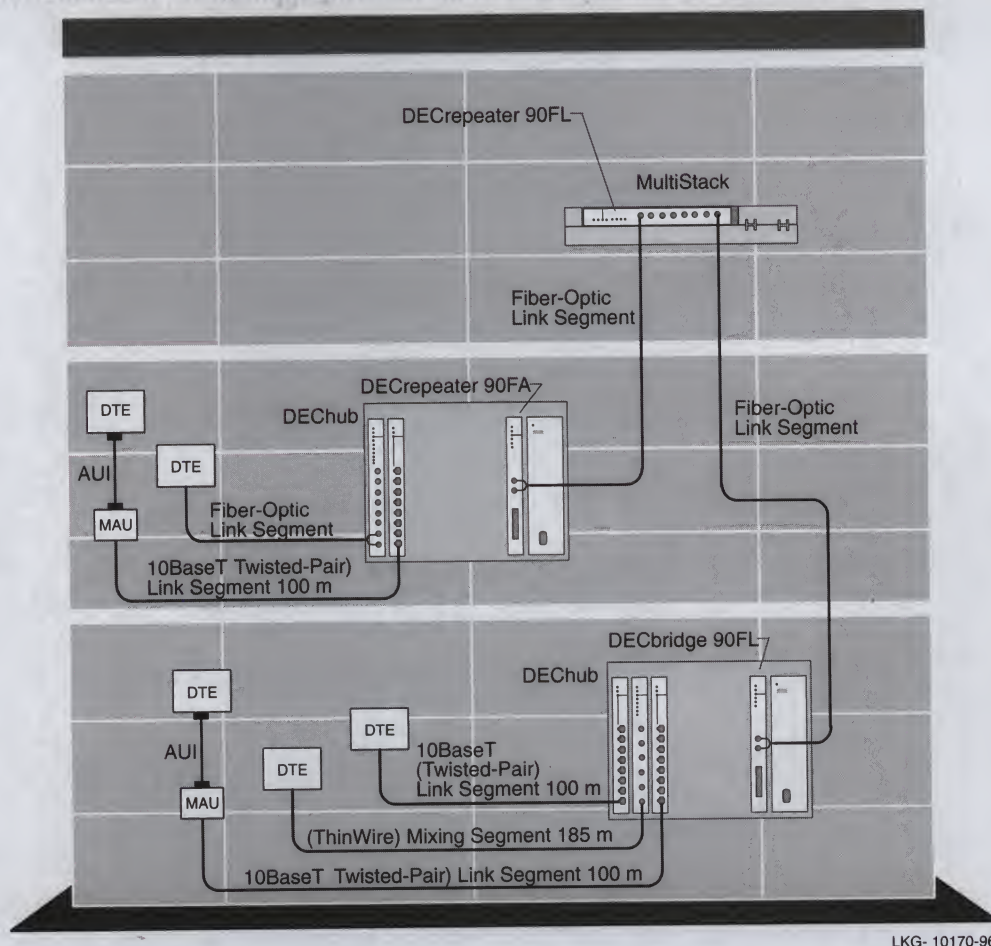
## Local Area Network Applications

### 802.3/Ethernet Copper and Point-to-Point Fiber

This section describes all of the copper media and point-to-point fiber repeater links, which include IEEE 802.3, fiber (FOIRL and 10BaseFL), 10BaseT, and 10Base2 media. Figure 4-11 shows a configuration example for 802.3/Ethernet showing fiber Ethernet using the DEChub 900, DEChub 90, and MultiStack platforms with repeaters, bridges, and transceivers within the local area network structure.

#### Note

In the following illustrations, DEChub refers to either a DEChub 900 or a DEChub 90.



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Figure 4-11: IEEE 802.3/Ethernet Configurations



## Local Area Network Applications

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### Bridges — Overview

DIGITAL offers a family of full-performance bridges suitable for all types of media — Ethernet, Fiber, Token Ring, and so forth. DIGITAL's bridges offer various configurations and number of ports supported to enable the most efficient use of existing wiring and networks.

#### Note

**For a complete list of the DEChub networking bridges and their functionality, see the *Network Products Guide*.**

### DECbridge 90FL Implementation

The DECbridge module is a specialized LAN device that connects two Ethernet or IEEE 802.3 LANs to form a single, extended, local area network. One LAN consists of a work group of up to 200 stations in size — a work group exceeding 200 stations enables flood mode. Flood mode forwards all packets, which increases traffic in the work group. It also allows stations in the work group that never transmit to receive packets from the backbone.

When used in standalone mode, the DECbridge module connects the workgroup LAN to the backbone LAN using ThinWire. When installed in the DEChub 90 or DIGITAL MultiSwitch 900 backplanes, the DECbridge 90FL bridge connects to the backplane through its DIN connector. The DECbridge 90FL module provides a 15-pin AUI connection to the backbone and a 10BaseFL fiber connection to the backbone; this is backward compatible to the FOIRL fiber standard.

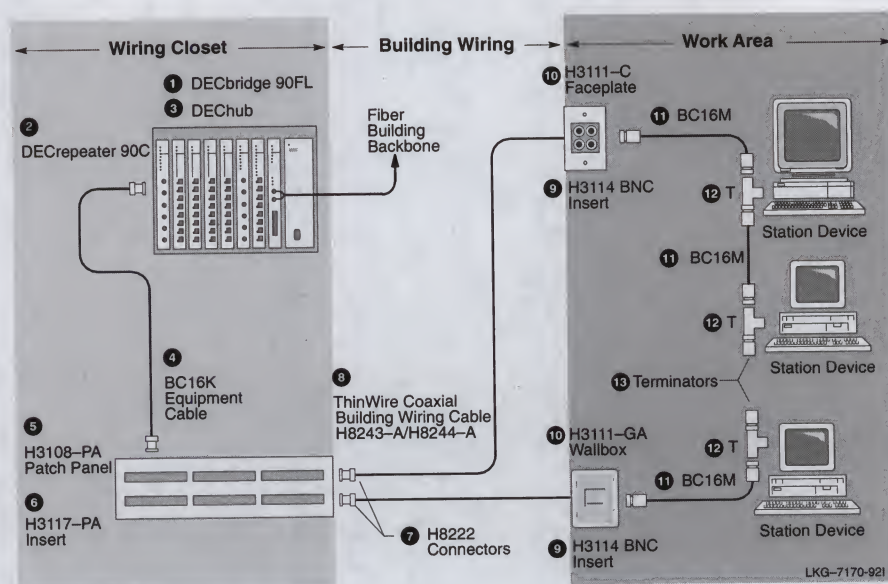
Figure 4-12 illustrates a typical horizontal configuration using the DEChub 90 backplane, DECbridge 90FL, and DECpeater 90C. Table 4-1 lists the components required to connect the DECbridge 90FL to the horizontal distribution subsystem.



## Local Area Network Applications

**Table 4-1: Parts List for DECbridge 90FL and DECRepeater 90C Solution**

Item Number	Option Number	Quantity for Six Ports	Description	Page
1	DEWGF-MA	1	DECbridge 90FL	NA
2	DECMR-MA	1	DECRepeater 90C	NA
3	—	—	DEChub platform	NA
4	BC16K-xx	6	BNC-to-BNC ThinWire equipment cable	3-32
5	H3108-PA	1	Patch panel frame for six 8-pin inserts	3-2
6	H3117-PA	1	8-pin BNC coupler insert	3-3
7	H8222	6	Male BNC connectors	3-33
8	H8243-A/H8244-A	—	ThinWire cable	3-32
9	H3114-AB	1	Snap-in ThinWire BNC connector, kit of eight	3-31
10	H3111-C or H3111-GA	1	Modular faceplate or modular wallbox	3-7 3-7
11	BC16M	6	ThinWire office cable	3-32
12	H8223	—	BNC T-connector	3-32
13	H8225	—	BNC 50-ohm terminator	3-32



**Figure 4-12: DECbridge 90FL and DECRepeater 90C Solution**



## Local Area Network Applications

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### Switches — Overview

DIGITAL offers a complete line of full-performance switches suitable for applications with the desktop, department, or enterprise. All of DIGITAL's switches are fully 802.1D compliant and feature standards-based switching platforms for data integrity and interoperability.

#### Note

**For a complete list of the DEChub networking switches and their functionality, see the *Network Products Guide*.**

### DECswitch 900EF Implementation

The DECswitch 900EF provides the interconnection between six 10 Mb/s Ethernet LANs and a high-speed 100 Mb/s Fiber Distributed Data Interface (FDDI) network backbone.

As a self-learning IEEE 802.1d Media Access Control (MAC) bridge, the DECswitch 900EF performs standard functions such as filtering and forwarding. In addition, the module performs high-speed, transparent translation of network data packets between the FDDI and Ethernet networks.

The DECswitch 900EF is protocol-independent. As such, it accommodates multiple protocols such as DECnet, LAT, TCP/IP, or any other protocol running on FDDI and Ethernet LANs. The module operates transparently for plug-and-play network operations, and includes flexible filtering options for destination and source addresses and protocols.

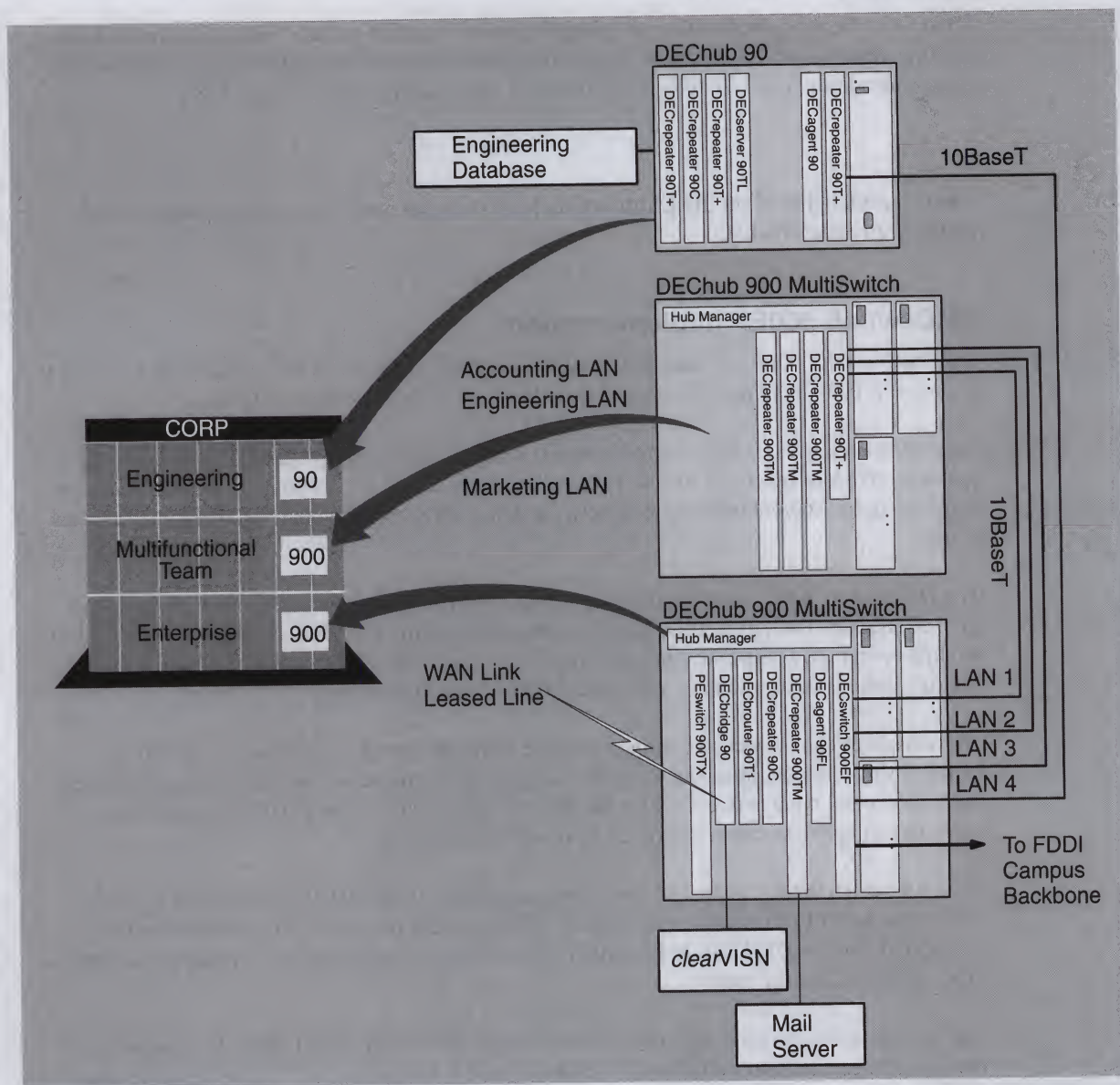
These features can be accessed through Simple Network Management Protocol (SNMP) management software, allowing network managers to determine which users or groups of users can gain access to the networks. As with other bridge products from DIGITAL, access to network management can be restricted by password protection.

The DECswitch 900EF standards-compliant technology (IEEE 802.1d, 802.1h, 802.1i, 802.2, 802.3, and ANSI FDDI) ensures operability in multivendor networks. The module can be configured into the DIGITAL MultiSwitch 900 and can be configured as a standalone unit into a DEChub ONE docking station.

The configuration shown in Figure 4-13 illustrates a DECswitch 900EF providing the interconnection between the four individual 10 Mb/s Ethernet LANs and connecting them to the enterprise network through its FDDI port to an FDDI campus backbone.



## Local Area Network Applications



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Figure 4-13: DECswitch 900 Providing Interconnection for 10 Mb/s LANs to FDDI Campus Backbone



## Local Area Network Applications

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### Repeaters — Overview

DIGITAL offers a complete line of full-performance repeaters providing network connectivity to a variety of Ethernet devices. DIGITAL's repeater modules can be used standalone, stackable, and chassis based for easy network design, configuration, and installation.

#### Note

**For a complete list of the DEChub networking repeaters and their functionality, see the *Network Products Guide*.**

### 10BaseF LAN Repeaters Implementation

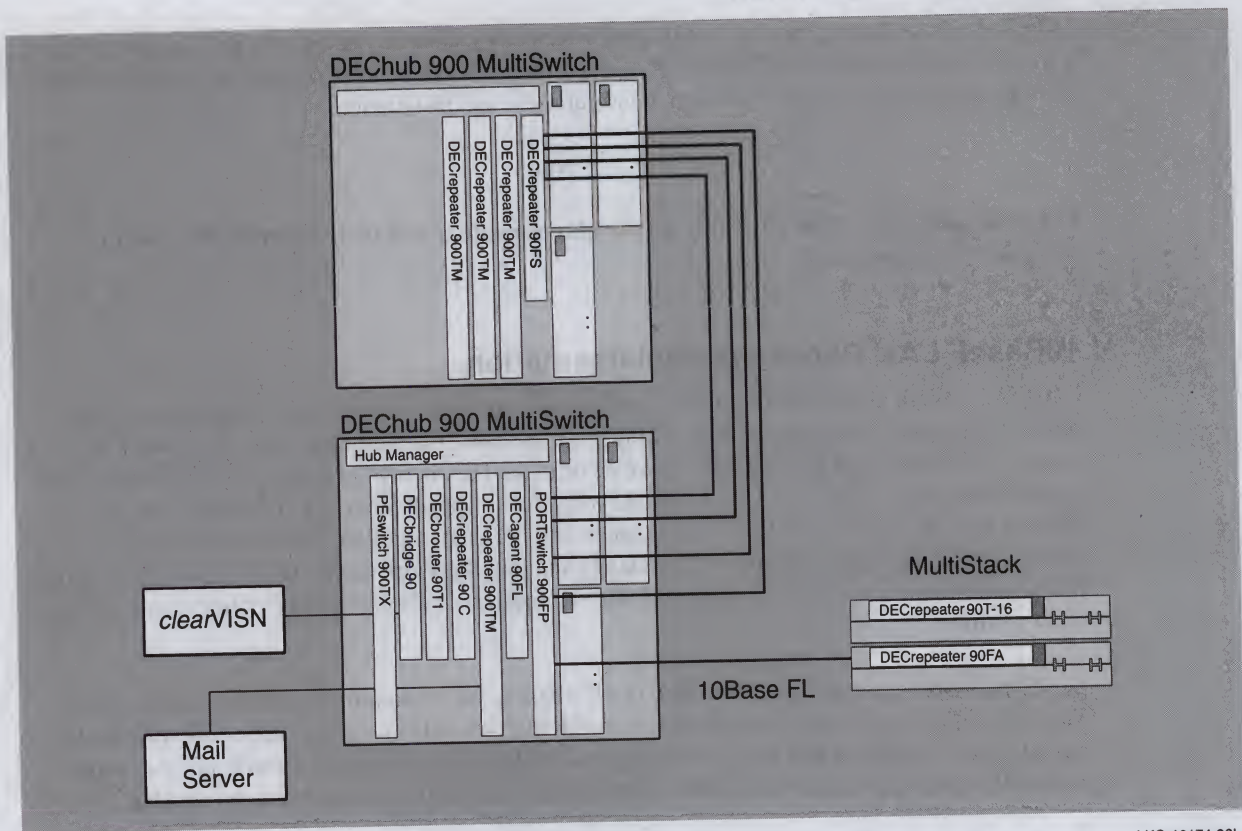
DIGITAL's Work Group family of fiber modules are compact, easy to use, and provide the flexibility to support a wide range of networking environments. Each module, only 11 inches x 1.25 inches x 5.5 inches, can be used as a stackable or in the DEChub 90 or DIGITAL MultiSwitch 900. Modules are easy to install and remove and can be hot swapped. Status LEDs on each port, plus DC OK and activity, provide for local management and port status checks. These competitively priced modules meet the industry-standard 10BaseFL, and join the Work Group family's LAT and multi-protocol terminal servers, 10Base2 and 10BaseT repeaters, high-performance bridge, and management modules.

DIGITAL's fiber products are 10BaseFL/FOIRL based, the predominant protocol in the industry. The 10BaseFL protocol does not interoperate with the 10BaseFB protocol supported by some third-party products. 10BaseFB is limited to backbone applications in a network configuration, while 10BaseFL can be specified for both backbone applications and applications to the desktop.

Figure 4-14 illustrates the 10BaseF product set in a typical building configuration using the DEChub 900 and MultiStack platforms.



## Local Area Network Applications



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**Figure 4-14: DECrepeater 90FS and PORTswitch 900FP Creating a Fiber-Optic LAN with a MultiStack and DEChub 900 Platforms**



## Local Area Network Applications

### 10BaseT LAN Repeaters

The 10BaseT application allows the high-speed 802.3/Ethernet protocol to run over shielded or unshielded twisted-pair cabling. Due to its low cost per connection and its ability to support many applications, unshielded twisted-pair (UTP) cabling is widely used for horizontal distribution and work area wiring. DIGITAL's implementation of the 802.3/Ethernet 10BaseT product set is fully compliant with the IEEE standards.

#### Note

**The following configurations illustrate a full cross-connect network implementation. If the customer simply requires a direct interconnect, then only one patch panel is necessary and the panel insert and equipment cable will change.**

### DECrepeater 90TS Implementation

The module's eight 10BaseT ports (MJ-8 connectors) are on the front panel, and support 100-ohm UTP and 100-ohm screened twisted-pair (ScTP) cables.

Figure 4-16 shows a DECrepeater 90TS in a typical, small, horizontal configuration using a DEChub 90 as the platform. (A DEChub 900 or MultiStack also may be used.) Table 4-2 lists the components required to connect the DECrepeater 90TS to the OPEN DECconnect horizontal distribution subsystem. Figure 4-15 illustrates the end-to-end pin wiring for this application.



## Local Area Network Applications

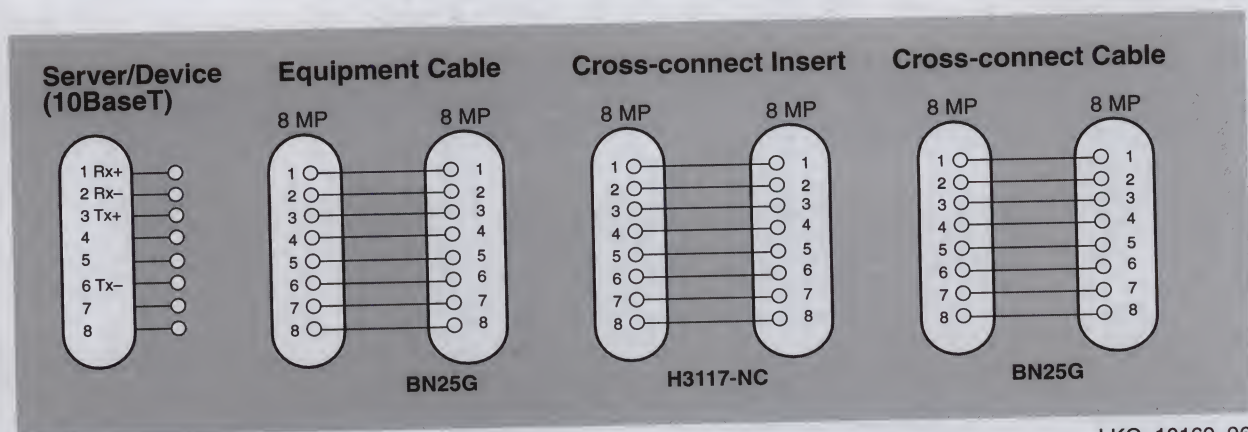
Table 4-2: Parts List for DECRepeater 90TS and OPEN DECconnect

Item Number	Option Number	Quantity for Six Ports	Description	Page
1	DETM1	1	DEChub 10BaseT Repeater	
2		1	DEChub platform	
3	BN25G	8	8-pin MP to 8-pin MP equipment cable	3-11
4	H3108-PA	1	Patch panel frame for six 8-pin inserts	3-2
5	H3117-NC	1	8-pin MJ to 8-pin MJ insert	3-3
6	BN25G-xx	8	8-pin MP to 8-pin MP equipment cable	3-11
7	H3117-LA	1	8-pin MJ to 110 punchdown panel insert	3-3
8	H8245-A/H8246-A or H8245-C/H8246-C		4-pair UTP building wiring cable	3-16
9	H3112-E/F/G/H (series)	1	Snap-in data connectors for UTP — kit of eight	3-7
10	H3111-C or H3111-GA	1	Modular faceplate kit of eight or modular wallbox	3-7
11	BN25G-xx	8	8-pin MP to 8-pin MP office cable	3-11

### Notes

For your specific implementation, see the *Network Products Guide*.

For mass termination at the patch panel, use the BN26R cable and the H3117-MA insert.



LKG-10169-961

Figure 4-15: Pin-to-Pin Wiring for DECRepeater 90TS/OPEN DECconnect



## Local Area Network Applications

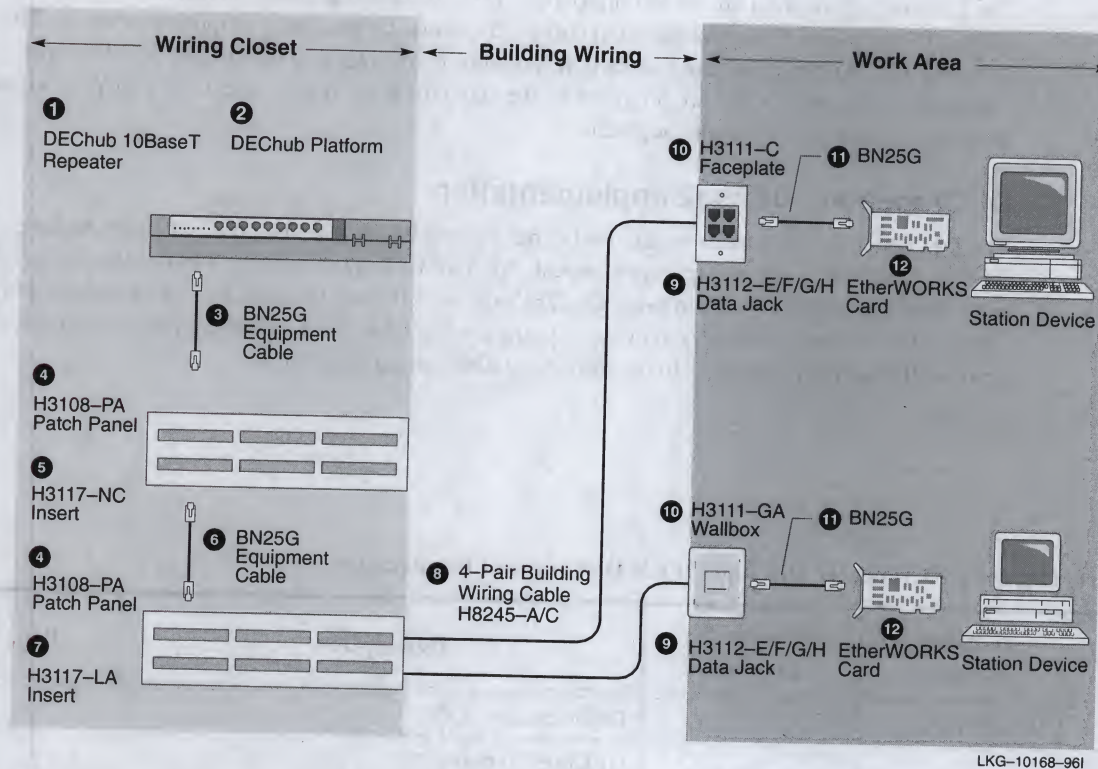
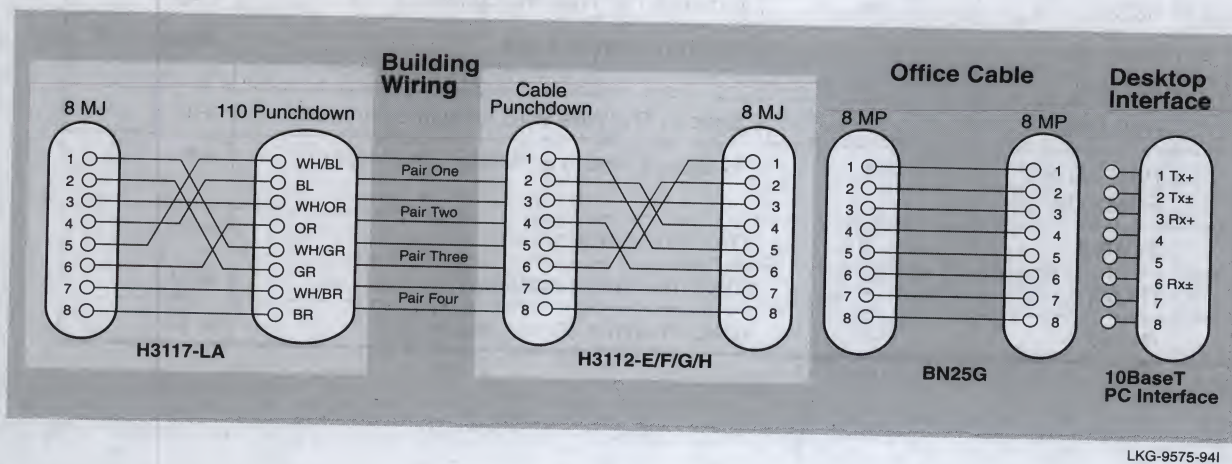


Figure 4-16: DECrepeater 90TS Application





## Local Area Network Applications

### 10Base2 LAN Repeaters

The 10Base2 application allows the high-speed 802.3/Ethernet protocol to run over ThinWire coaxial cabling for connecting personal computers, workstations, and computing systems. The 10Base2 ThinWire cabling and connection products are designed to the IEEE 802.3/Ethernet standard. Cable connections are provided by the standard BNC-type connectors. ThinWire supports up to 29 stations per 185-meter segment.

### DECrepeater 10Base2 Implementation

The DECrepeater 90C can be configured either standalone or with the DEChub 90 backplane. The DECrepeater 90C is a compact 6-port repeater that allows up to 29 stations to be attached to each port. This application is shown using the DECrepeater 90C and the DEChub 90 backplane with the OPEN DECconnect cabling system (see Figure 4-17). Table 4-3 lists the components required to connect the DECrepeater 90C to the horizontal distribution subsystem.

**Table 4-3: Parts List for DECrepeater 90C and OPEN DECconnect Connections**

Item Number	Option Number	Quantity for Six Ports	Description	Page
1	DECMR-MA	1	DECrepeater 90C	
2		—	DEChub 90 platform	
3	BC16K-xx	6	BNC-to-BNC ThinWire coaxial equipment cable	3-32
4	H3108-PA	1	Patch panel frame for six 8-pin inserts	3-2
5	H3117-PA	1	Snap-in ThinWire patch panel insert kit	3-3
6	H8222	6	Ethernet ThinWire end connector	3-33
7	H8243-A/ H8244-A	—	ThinWire coaxial cable	3-32
8	H3114-AB	1	Snap-in ThinWire BNC faceplate connector	3-31
9	H3111-C or H3111-GA	1	Modular faceplate or modular office wallbox	3-7
10	BC16M	6	ThinWire coaxial cable	3-32
11	H8223	—	BNC ThinWire T-connector	3-33
12	H8225	—	BNC ThinWire 50-ohm terminator	3-33



## Local Area Network Applications

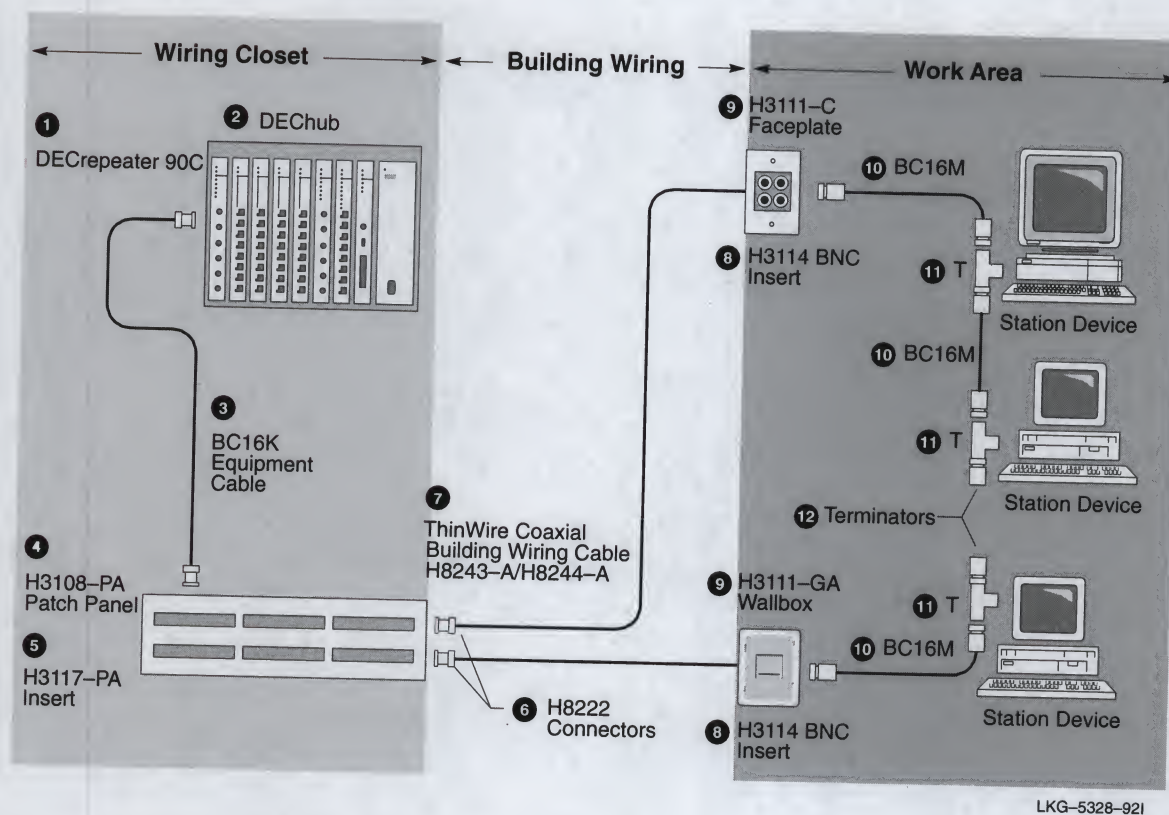
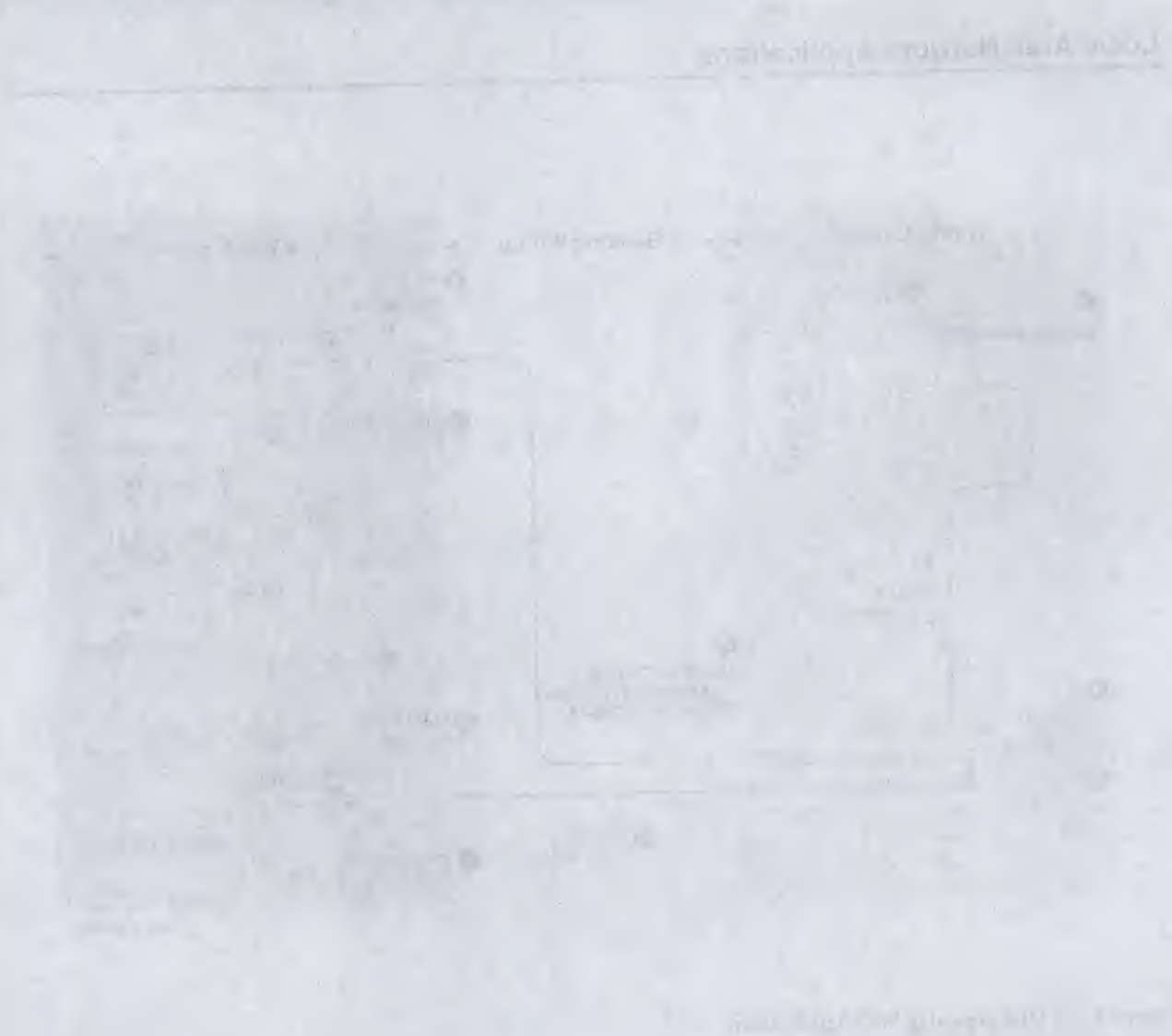


Figure 4-17: DECRepeater 90C Application







## Local Area Network Applications

### Local Terminal Servers — Overview

DIGITAL offers a complete line of high-performance, full-function terminal servers that support asynchronous device speeds up to 115.2 Kb/s to local nodes. DIGITAL's terminal servers also provide remote access (dial-in) and modem pool (dial-out) support for remote personal computing devices.

#### Note

For a complete list of the DEChub networking terminal servers and their functionality, see the *Network Products Guide*.

### DECserver 900TM Implementation

The DECserver 900TM is a 32-port Network Access Server that connects asynchronous devices including terminals, printers, modems, or personal computers to an Ethernet LAN. The DECserver 900TM operates as a DIGITAL MultiSwitch 900 module or can be configured as a standalone access server. The DECserver 900TM is configured with 32 MJ8 (RJ-45) connectors and provides software-selectable limited modem control. The DECserver 900TM supports DECserver Network Access Software, which can be downline loaded from an appropriate host system or self-loaded from an optional externally accessible flash memory card.

This application shown in Figure 4-19 uses the DECserver 900TM and the DIGITAL MultiSwitch 900 backplane with the OPEN DECconnect cabling system. Table 4-4 lists the components required to connect the DECserver 900TM to the horizontal distribution subsystem. Figure 4-18 illustrates the end-to-end pin wiring for this application.



## Local Area Network Applications

Table 4-4: Parts List for DECserver 900TM and OPEN DECconnect Connections

Item Number	Option Number	Quantity for 8 Ports	Description	Page
1	DSRVZ-MA	1	DECserver 900TM	
2	—	1	DEChub platform	
3	BN26R-03	1	8-pin MP to 50-pin equipment cable	3-13
4	H3108-PA	2	Patch panel frame for six 8-pin inserts	3-2
5	H3117-MA	1	8-pin MJ to 50-pin panel insert	3-3
6	BN25G-xx	8	8-pin MP to 8-pin MP equipment cable	3-11
7	H3117-LA	1	8-pin MJ to 110 punchdown panel insert	3-3
8	H8245-A/H8246-A or H8245-C/H8246-C		4-pair UTP building wiring cable	3-16
9	H3112-E/F/G/H (series)	1	Snap-in data connectors for UTP — kit of eight	3-7
10	H3111-C or H3111-GA	1	Modular faceplate, kit of eight or modular wall-box	3-7
11	BN24H-xx		8-pin MP to 6-pin MMP office cable — cross-over	3-12

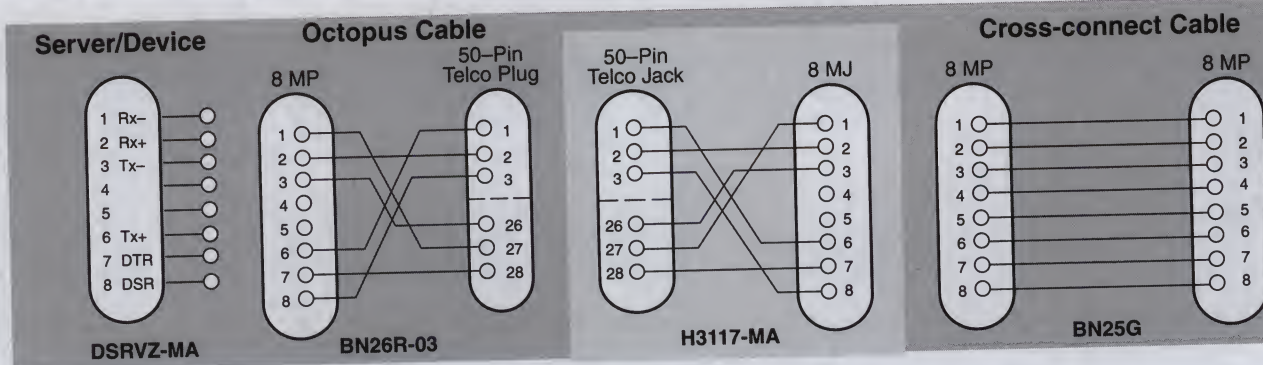


Figure 4-18: Pin-to-Pin Wiring Diagram for DECserver 900TM/OPEN DECconnect



## Local Area Network Applications

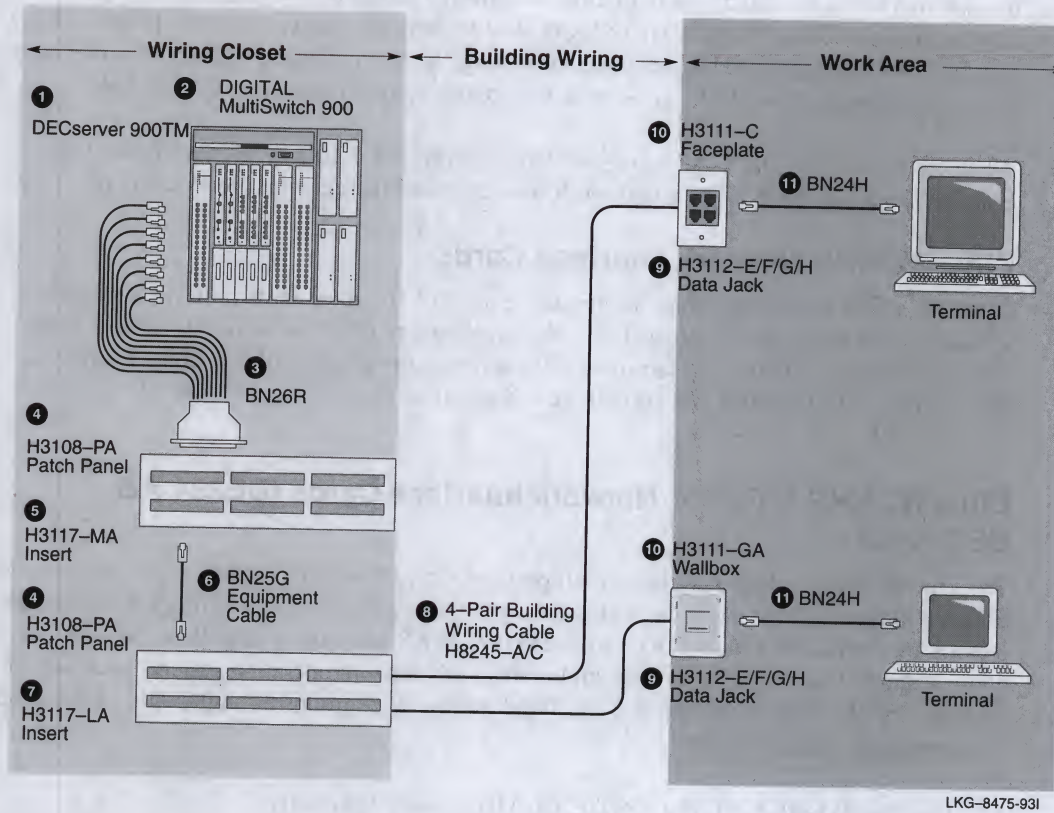
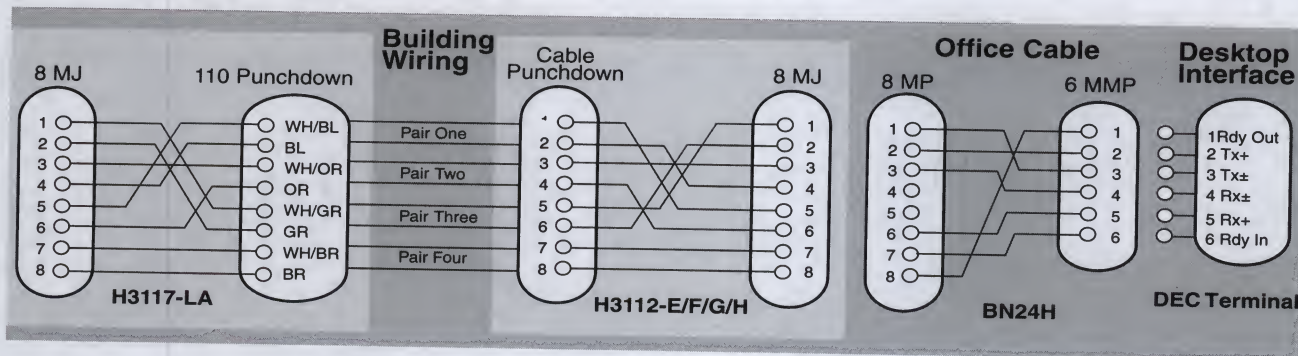


Figure 4-19: DECserver 900TM Application





## Local Area Network Applications

### EtherWORKS Hub 8TX

As an addition to DIGITAL's extensive hub family of products, the EtherWORKS Hub 8TX is the first in a series of "fixed" configuration, unmanaged products. As DIGITAL's first Fast Ethernet hub, the EtherWORKS Hub 8TX is ideal for small or branch offices with low-density, Fast Ethernet work group needs, such as sharing large files or obtaining high-speed server access for high-performance applications — including graphics, multimedia, and CAD/CAM.

When combined with DIGITAL's low-cost Fast EtherWORKS 10/100 interface cards, the EtherWORKS Hub 8TX offers a high-performance, Fast Ethernet workgroup solution.

### EtherWORKS Network Interface Cards

DIGITAL offers a full line of high-performance network interface cards (NICs) for personal computers and workstations to reach file, disk, application, print, and network services from Ethernet networks. DIGITAL's family of NICs covers a broad range of bus structures (EISA, ISA, PCI), speeds (10 Mb/s and 100 Mb/s), and media interfaces (TP, AUI, BNC).

### EtherWORKS 3 Turbo, Network Interface Cards (DE204-AB, DE205-AB)

The EtherWORKS 3 Turbo cards are high-performance, 16-bit, ISA controllers for multivendor Ethernet vendors. These cards use a chip employing the latest silicon technology. EtherWORKS 3 cards are certified to run on DIGITAL's PATHWORKS and Novell's NetWare network operating systems. The cards also support multivendor PC network operating systems such as LAN Manager, SCO UNIX, Windows NT, and Windows for Workgroups through NDIS-, ODI-, and IPX-compliant software drivers.

- The EtherWORKS 3 Turbo TP (DE204-AB) is twisted pair only
- The EtherWORKS 3 Turbo Plus (DE205-AB) includes connectors for ThinWire, thick wire, and twisted-pair on the same card



## **Local Area Network Applications**

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### **EtherWORKS Turbo EISA NIC (AUI, BNC,TP) (DE425-AA)**

The EtherWORKS Turbo EISA (DE425-AA) PC NIC is a DMA design with a 32-bit data path that maximizes system and network data throughput. It is ideal for high-performance EISA bus servers running Windows NT that need to maximize system throughput. The EtherWORKS Turbo EISA can be used with industry-standard Intel486 or Pentium-based systems, and DIGITAL's Alpha systems with an EISA bus.

### **EtherWORKS Turbo PCI 10 Network Interface Card (DE450-xx)**

The EtherWORKS Turbo PCI 10 Network Interface Card (DE450-xx) incorporates the DC21041. A DMA bus master design, fast cut-through FIFO buffer (2 x 256B on-chip FIFOs), and other patented features add to your performance advantage. This adapter minimizes CPU utilization, so the system's CPU can focus on compute-intensive applications. Finely tuned drivers ensure compatibility and fast performance. The full-duplex feature enables you to run at 20 MB/s. This card also allows more client connections per server, reducing system investments. Finally, remote boot capability uses lower cost, diskless workstations in the network.

### **Fast EtherWORKS PCI 10/100 Adapter (DE500-AA)**

The Fast EtherWORKS PCI 10/100 (DE500-AA) is a high-performance adapter that uses PCI bus systems to connect to 10 Mb/s or 100 Mb/s Ethernet networks. Its support for 10BaseT and 100BaseTX ensures easy migration.



### ETHERWORKS TERN EISA NIC (NIC 10/100/1000)

The Tern (10/100/1000) is a high-speed Ethernet network interface card (NIC) that supports 10, 100, and 1000 Mbps data rates. It is designed for use in EISA slots and is compatible with Windows 9x, Windows NT, and Linux operating systems. The Tern NIC features a built-in LED indicator to show network activity and a non-volatile memory (NVRAM) for storing MAC address information.

### ETHERWORKS TERN PCI 10 Network Interface Card (DE480-K)

The Tern PCI 10 is a 10 Mbps Ethernet network interface card (NIC) designed for use in PCI slots. It supports 10 Mbps data rates and is compatible with Windows 9x, Windows NT, and Linux operating systems. The card features a built-in LED indicator to show network activity and a non-volatile memory (NVRAM) for storing MAC address information. It also includes a BNC connector for coaxial networking.

### Fast EthernetWORKS PCI 10/100 Adapter (DE100-4A)

The Fast EthernetWORKS PCI 10/100 Adapter (DE100-4A) is a high-speed Ethernet network interface card (NIC) that supports 10 and 100 Mbps data rates. It is designed for use in PCI slots and is compatible with Windows 9x, Windows NT, and Linux operating systems. The adapter features a built-in LED indicator to show network activity and a non-volatile memory (NVRAM) for storing MAC address information.



## Local Area Network Applications

### 802.5/Token Ring Applications/Configurations

DIGITAL provides a full line of Token Ring networking products that use passive building wiring to create local area networks (LANs). LANs allow the user at the desktop to access the full computing power of the organization through distributed processing.

This section provides an overview of the Token Ring product set and illustrates the applications and configurations for DIGITAL's DEChub based Token Ring communication products incorporated in the OPEN DECconnect horizontal wiring subsystem.



## Local Area Network Applications

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### 802.5/Token Ring Overview

DIGITAL's 802.5/Token Ring-compatible products offer customers a comprehensive approach for providing a physical connection between individual devices on a LAN or a wide area network (WAN).

These operating environments are supported for the 802.5/Token Ring:

- PATHWORKS for OpenVMS (VAXserver)
- PATHWORKS for DOS (Client)
- PATHWORKS for OS/2 (Client and Server)
- PATHWORKS for DOS (TCP/IP)
- PATHWORKS for OS/2 (TCP/IP)
- PATHWORKS for DOS (NetWare Coexistence)

DECnet and TCP/IP networks support PATHWORKS for DOS and OS/2 systems on 802.5/Token Ring.

The 802.5/Token Ring can perform at a transfer rate of 4 Mb/s or 16 Mb/s.

The 802.5/Token Ring-compatible products include controllers and media filters, routers, cables and interconnects, medium attachment units (MAUs), software, and services.

### DEChub 900 Token Ring Products

The DIGITAL MultiSwitch 900 Token Ring product set provides reliable configuration flexibility and multimedia support for shielded, screened, and unshielded 802.5/Token Ring networks.

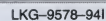
#### Note

For complete product information see the *Network Products Guide*.

Hubs and MAUs provide reliable configuration flexibility and multimedia support for shielded, screened, and unshielded 802.5/Token Ring networks. They provide the interconnecting points for all node devices within the 802.5/Token Ring.



## 802.5/Token Ring Network Application





## Configuration Highlights

High-performance Category 5 building wiring and patch cables are required to reduce the crosstalk between the transmit and receive pairs within the cable to achieve a 100-meter (328 ft) distance for 16-Mb/s Token Ring operation over twisted-pair cabling.

The office cable within the work area connects to the network interface card (NIC) that resides inside the personal computer. At the wiring closet, the equipment room cable connects to the multistation access unit in the DIGITAL MultiSwitch 900.

## Cable Plant Component Requirements

The ring-in and ring-out ports on the multistation access unit are used to connect additional MAUs within the same wiring closet or extended to other closets via a backbone cable connection.

The multistation access unit, which DIGITAL recommends, is a passive device that connects the transmit pair of each lobe to the receive pair of the adjacent lobe. The MAU provides the function of the logical ring connections to the OPEN DECconnect physical star wiring (see Figure 4-21). Additional functions of the MAU include:

- Indicator lights that show nodes in or out of the ring
- Remote network management
- Fault detection
- Special isolation privileges for network managers

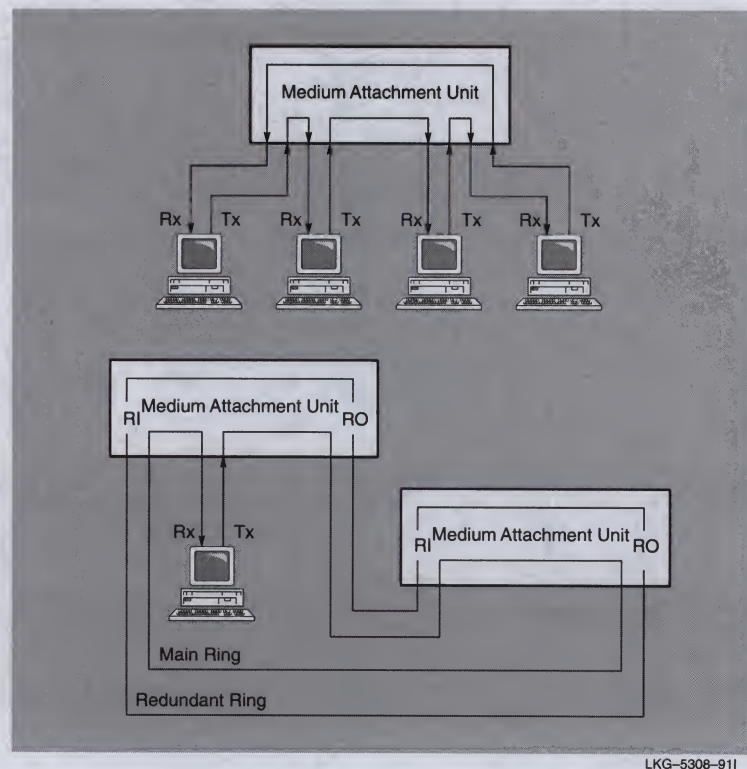


Figure 4-21: Connection of Medium Attachment Units



The media filter provides several functions; for example, filtering is done on the signaling to provide FCC compliance for use with unshielded twisted-pair cabling. Impedance matching is provided to connect to the 100-ohm UTP cabling.

The following cable plant components are required to provide the Token Ring connection:

- Token Ring medium attachment unit (MAU) with 8-pin modular jack
- High-performance equipment room cable with 8-pin modular plug
- 8-pin modular patch panel
- High-performance building wiring cable
- 8-pin modular faceplate
- High-performance office cable with built-in media filter and IBM connector
- Token Ring media filter (balun)-required for network interface cards with DB-9 connectors

### Configuration Requirements

The configuration requirements for 4-Mb/s and 16-Mb/s Token Ring operation over twisted-pair cabling are listed in Table 4-5.

**Table 4-5: Configuration Requirements for Token Ring Operation**

Description of Configuration Requirements	4-Mb/s Token Ring Operation (Maximum)	16-Mb/s Token Ring Operation (Maximum)
Cable length in the horizontal (lobe length), including building wiring and patch cables	100 m (328 ft)	100 m (328 ft)
Number of nodes in a single ring <sup>1</sup>	260	100
Number of medium attachment units (MAUs) in a single ring	33	13
Building wiring cable		
Standard data grade	Required	See footnote <sup>2</sup>
High-performance data grade	Optional	Required
Patch cable for office and equipment room	Required	Required
<sup>1</sup> For efficient operation, DIGITAL recommends keeping the size of the individual Token Rings small — 20 to 40 nodes per ring. <sup>2</sup> Standard data grade cable can be used at reduced distance lengths only if these cables meet the specific requirements noted in Appendix C.		



## Horizontal Cabling Design

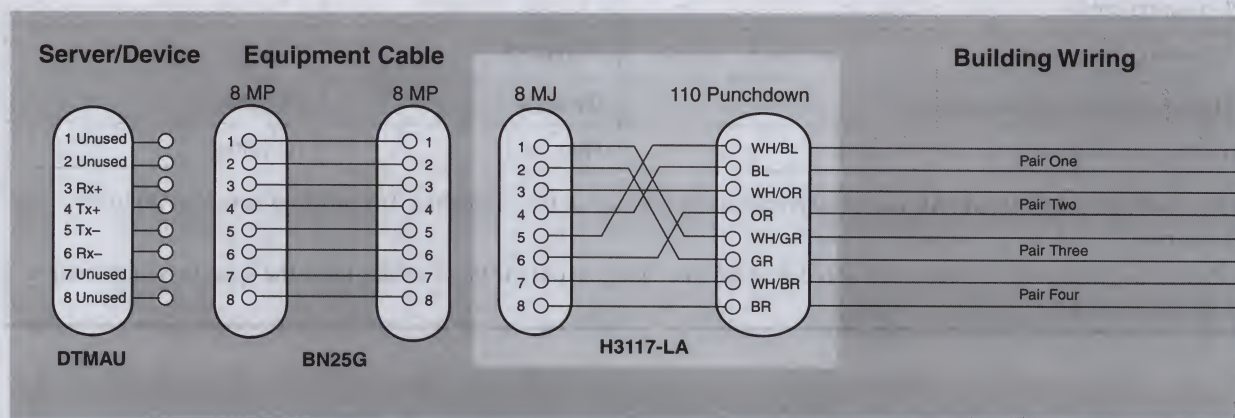
Figure 4-23 illustrates the components and the cabling required to connect from the wiring closet to the work area. Table 4-6 lists the components required to connect the DTMAU, DIGITAL Token Ring MAU, to the horizontal distribution subsystem. Figure 4-22 illustrates the end-to-end pin wiring for this application. (Although the figure shows a DEChub 900, any platform will work.)

**Table 4-6: Parts List for Cabling Components**

Item Number	Part Number	Description	Page
1		DTMAU	NA
2		DEChub platform	NA
3	BN25G-xx	High-performance data grade patch cable	3-11
4	H3108-PA	Patch panel frame	3-2
5	H3117-LA	8-pin MJ to 110 punchdown insert	3-3
6	H8245-C/H8246-C	High-performance data grade building wire	3-16
7	H3111-C or H3111-GA/GB/GC and H3112-E/F/G/H	Modular faceplate, kit of eight or modular wallbox and 8-pin MJ data connector	3-7
8		Media filter for network interface cards	NA
9		Token Ring interface card	NA

**Note**

**For connecting to 150-ohm STP systems, use the BN26T (100-ohm to 150-ohm balun) adapter cable.**



**Figure 4-22: OPEN DECconnect Wiring for 802.5 and Token Ring Transmission (Category 5)**



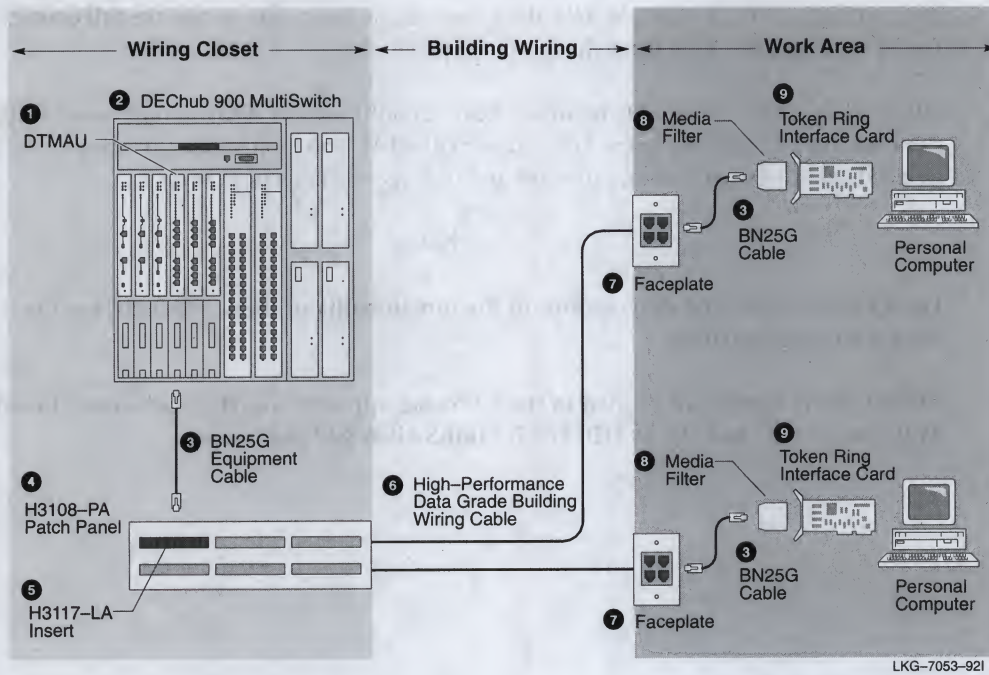
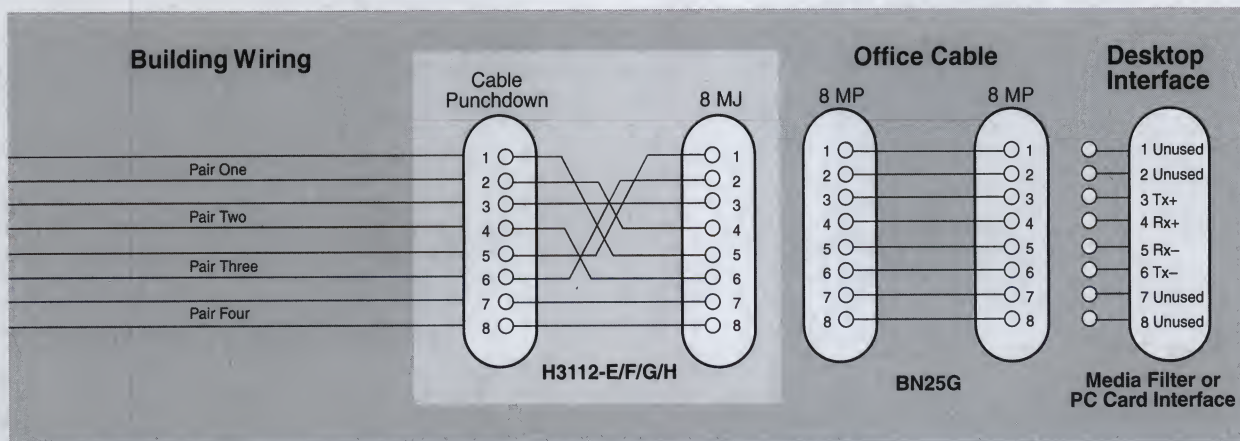


Figure 4-23: Components Cabled from the Wiring Closet to the Work Area





## Wide Area Network Applications

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DIGITAL provides a full line of networking products that use passive building wiring to create wide area networks (WANs). WANs allow users at the desktop to access the full computing power of the organization through distributed processing.

DIGITAL has an interoperable family of flexible, full-function WAN multiprotocol bridges and switches, both fiber and copper. They enable DIGITAL and multivendor systems to use international standards-based routing protocols and interoperate in an open style.

### Notes

**For a complete list and descriptions of the functionality of these products, see the *Network Products Guide*.**

**Except where specifically stated in the following applications, DEChub refers to either the MultiStack, DEChub 90, or DIGITAL MultiSwitch 900 platforms.**



## Wide Area Network Applications

### Brouters, Routers, and RouteAbout Central

#### RouteAbout Access Routers

The RouteAbout Access EW and RouteAbout Access TW routers connect remote offices with Ethernet or Token Ring LANs, respectively, to a central site or the backbone network. In addition to the LAN interface, each router has two T1/E1 serial lines for connection to private lines or public network services such as X.25 or Frame Relay. These routers can be used standalone or in the DEChub platforms. The RouteAbout Access EW is a DEChub module, which can also be used in the DIGITAL MultiSwitch 900. The RouteAbout Access TW is a half-height DEChub 900 module.

#### RouteAbout Central

The RouteAbout Central router provides cost-effective connectivity to multiple remote branch sites over public and private network services. The RouteAbout Central 900EW product provides two Ethernet and eight T1/E1 interfaces in a DEChub 900-compatible module. The RouteAbout family interoperates with other RouteAbout routers, the DECswitch router, and DECNIS routers over leased lines.

#### DECbrouters

##### DECbrouter 90 Implementation

The DECbrouter provides a multiprotocol internetworking solution for linking Ethernet networks across a wide area network. It can route and bridge a large variety of networking and routing protocols being used on local and wide area data networks.

##### Features

Specific capabilities offered by the DECbrouter 90 are:

- Integrated IS-to-IS, OSPF, IGRP
- Integrated SNMP management
- Bridging and compression of LAT
- Supports all Cisco protocols
- Protocol translation

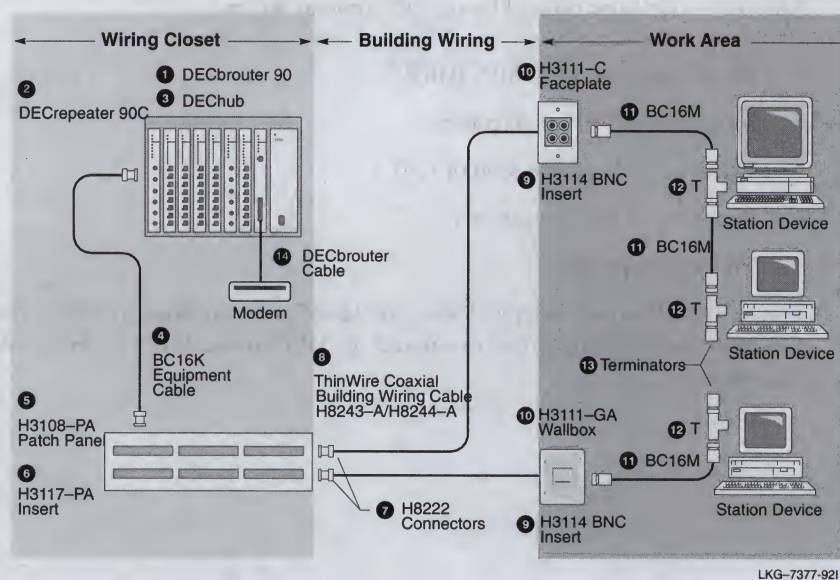
Figure 4-24 illustrates a typical horizontal configuration using the DECbrouter 90. Table 4-7 lists the components required to connect the DECbrouter 90 to the horizontal distribution subsystem.



## Wide Area Network Applications

Table 4-7: Parts List for DECbrouter 90

Item Number	Option Number	Quantity for Six Ports	Description	Page
1	DEWB1-MA	1	DECbrouter 90	NA
2	DECMR-MA	1	DECrepeater 90C	NA
3		—	DEChub platform	NA
4	BC16K-xx	6	BNC-to-BNC ThinWire equipment cable	3-32
5	H3108-PA	1	Patch panel frame for six 8-pin inserts	3-2
6	H3117-PA	1	8-pin BNC coupler insert	3-3
7	H8222	6	Male BNC connectors	3-33
8	H8243-A/ H8244-A	—	ThinWire cable	3-32
9	H3114-AB	1	Snap-in ThinWire BNC connector, kit of eight	3-31
10	H3111-C or H3111-GA	1	Modular faceplate or modular wallbox	3-7 3-7
11	BC16M	6	ThinWire office cable	3-32
12	H8223	—	BNC T-connector	3-33
13	H8225	—	BNC 50-ohm terminator	3-33
14	BC12F/G/H/J/K/L	1	DECbrouter Cable	3-14



LKG-7377-921

Figure 4-24: DECbrouter 90



## Wide Area Network Applications

### DECwanrouter 90 Implementation

The DECwanrouter 90, a wide area enhancement to the DEChub family of networking products, is a wide area router that supports the protocols of TCP/IP, DECnet phase IV and V, and X.25, and can be managed by SNMP and NCL. It is a low-cost access router for connecting remote sites and branch offices to the corporate LAN. This router, like the other modules in the DEChub family, can operate standalone or in any of the DEChub platforms.

Figure 4-25 shows a typical, small, horizontal configuration of a DECwanrouter 90 connected to a modem and then to a WAN in the horizontal cross-connect (HC). Table 4-8 lists the components required to connect the DECwanrouter 90 and a DECrepeater 90C to the horizontal distribution subsystem.



## Wide Area Network Applications

Table 4-8: Parts List for DECwanrouter 90 and DECrepeater 90C

Item Number	Option Number	Quantity for Six Ports	Description	Page
1	DEWAR-MA	1	DECwanrouter 90	NA
2	DECMR-MA		DECrepeater 90C	NA
3			DEChub platform	NA
	DMHUB-AA		DEChub 900 MultiSwitch	NA
4	BC16K-xx	6	BNC-to-BNC ThinWire equipment cable	3-32
5	H3108-PA	1	Patch panel frame for six 8-pin inserts	3-2
6	H3117-PA	1	8-pin BNC coupler insert	3-3
7	H8222	6	Male BNC connectors	3-33
8	H8243-A/H8244-A	—	ThinWire cable	3-32
9	H3114-AB	1	Snap-in ThinWire BNC connector, kit of eight	3-31
10	H3111-C or H3111-GA	1	Modular faceplate or modular wallbox	3-7 3-7
11	BC16M	6	ThinWire office cable	3-32
12	H8223	—	BNC T-connector	3-33
13	H8225	—	BNC 50-ohm terminator	3-33

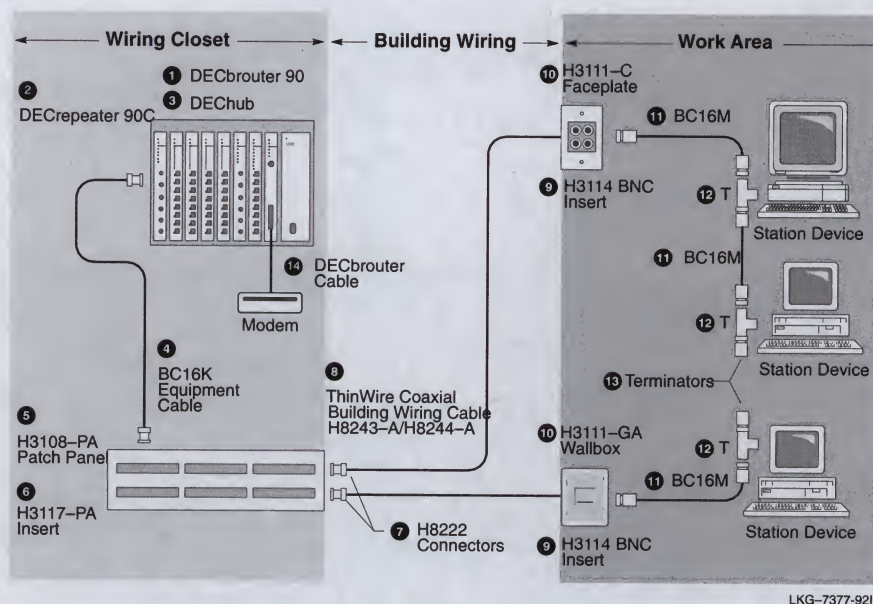


Figure 4-25: DECwanrouter 90 in DEChub 90/DIGITAL MultiSwitch 900 Driving Horizontal ThinWire



## Wide Area Network Applications

### Wireless

DIGITAL's family of wireless LAN products provide direct communication links between peers, clients, and buildings from virtually anywhere — without being physically connected to a network port.

### RoamAbout Access Point

RoamAbout Access Point is a two-port transparent bridge that connects a wired Ethernet (ThinWire or 10BaseT) local area network (LAN) and a wireless LAN. The Personal Computer Memory Card International Association (PCMCIA) Type II interface in the access point supports the DIGITAL RoamAbout PCMCIA network adapter, a radio frequency device, and other approved PCMCIA wireless network adapters.

Figure 4-26 illustrates a wireless LAN connection using the RoamAbout Access Point and personal computers, notebooks with PCMCIA network adapter cards.

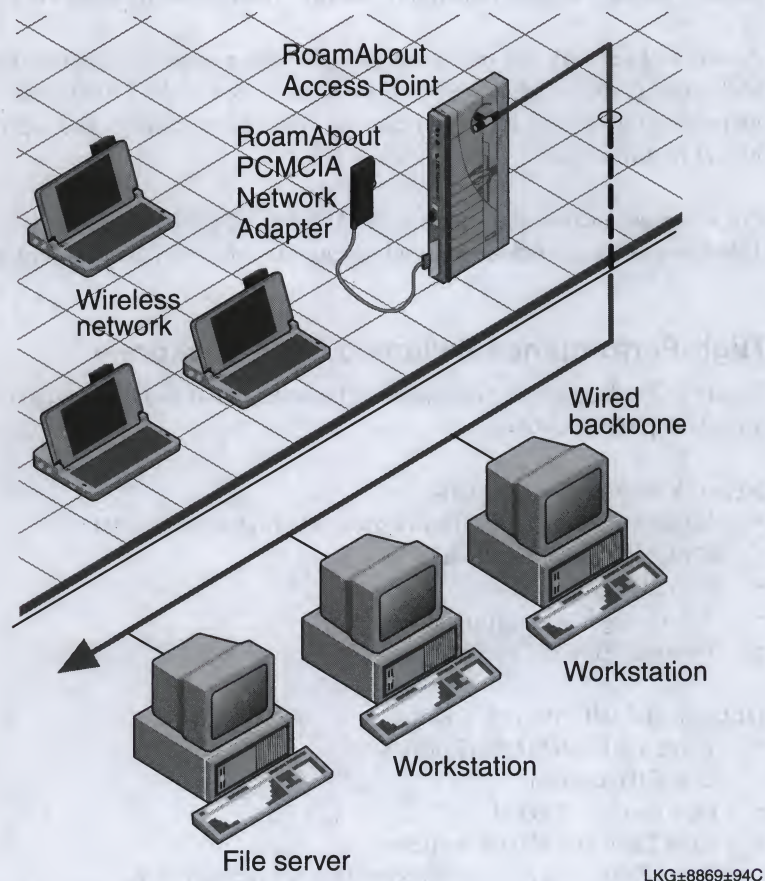


Figure 4-26: RoamAbout Access Point Configuration



## High-Performance Networks

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### High-Performance Networking with GIGAswitch/FDDI and GIGAswitch/ATM

Client/server computing, imaging, multimedia, online transaction processing, electronic data interchange, modeling, and visualization — emerging styles of computing demand high-performance, high-bandwidth networks.

A switched network offers more efficient communications for the traffic typically generated by today's user applications. Typical client/server network traffic consists mainly of short but intense bursts of information. When two systems sharing a LAN try to send large files simultaneously, the LAN can become slow and congested. If a third system tries to send data at the same time, it can bring down the network.

Switched networks can alleviate LAN traffic congestion. Instead of sharing a LAN with other systems, the switch provides a dedicated connection that lets each system use the full link bandwidth. Intense bursts of information can be sent between systems packet-by-packet — as fast as individual systems or protocols can send and receive them.

A switched network provides the dependable, time-sensitive delivery systems required for new multimedia and real-time applications. Applications such as high-resolution video, audio, and voice annotation cannot function if random communication delays occur.

A switched network can inherently provide high-performance networking at lower costs than traditional LANs or WANs. Switches can be placed in the LAN to increase throughput without increasing link speeds — so you can use existing investments and technologies to provide much higher performance.

For example, each system sharing one 100-Mb/s FDDI service can now be given a dedicated 100-Mb/s link to switch — without having to replace existing cabling and system adapters.

### High-Performance Switched FDDI Backbone

Figure 4-27 illustrates the connectivity between FDDI and Ethernet to create a high-performance switched FDDI backbone.

#### Network Design Requirements

- Migration of many local work groups to higher bandwidth
- Collapsed FDDI backbones
- Shared network servers
- A growing high-performance network
- Personal Ethernet to work groups

#### DEChub and GIGAswitch Solution

- Three DEChub 900 backplanes
- One GIGAswitch
- DECrepeater 900TM
- Nine PEs switch 900TX switches
- Two H7890 power supplies providing redundant power



## High-Performance Networks

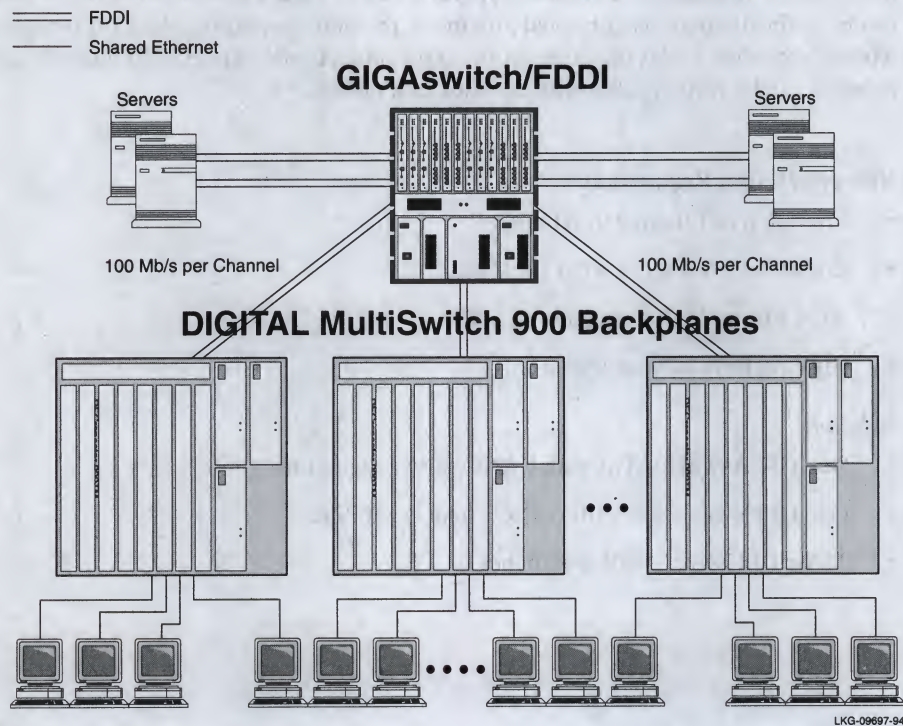


Figure 4-27: High-Performance Switched Backbone

### Ethernet to ATM

Figure 4-28 shows Ethernet/ATM connectivity using the GIGAswitch/ATM system with a DECswitch 400 running LANC emulation connected to DECswitch 900EE switches.

### LAN Emulation

LAN emulation provides an ATM Forum standard protocol that enables legacy LANs such as Ethernet to be interconnected with an ATM network by emulating LAN functionality over an ATM network.

The real benefit of LAN emulation is that it protects original equipment investment in hardware and applications while adding the high-speed capabilities of ATM to create a high-performance ATM backbone network.

### Switched Virtual Networks

A virtual network is a logical connection created through software. No longer just a concept, switched virtual networks are a reality with DIGITAL switches.



## High-Performance Networks

Switched virtual networks can help you maximize available bandwidth; dynamically manage moves, adds, or changes; and ensure proper levels of security. A network based on user needs can be defined rather than physical proximity, providing an express lane for project co-workers without crowding others on the network. If the project ends or responsibilities change, the virtual network can be reconfigured with the click of a mouse.

### *Network Design Requirements*

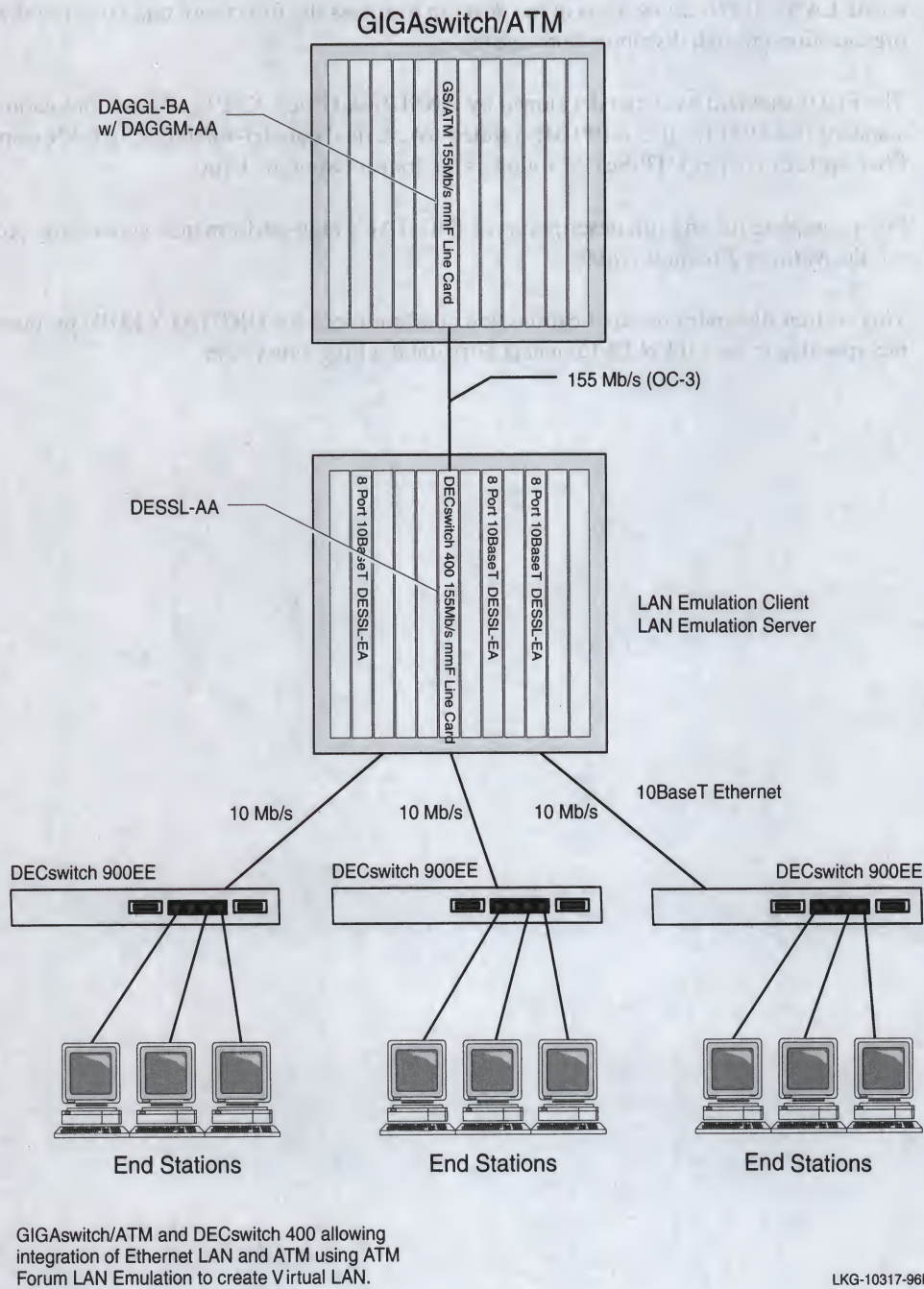
- Migration of Ethernet to ATM
- Collapsed Ethernet to ATM backbone
- ATM Forum LAN emulation (LANC)
- High-performance backbone

### *Solution*

- One GIGAswitch/ATM with LANC server capabilities
- One DECswitch 400 with LANC client capabilities
- Three DECswitch 900EE switches



## High-Performance Networks



**Figure 4-28: GIGAswitch/ATM and DECswitch 400 Allowing Integration of Ethernet LAN and ATM Using ATM Forum LAN Emulation to Create Virtual LAN**



## High-Performance Networks

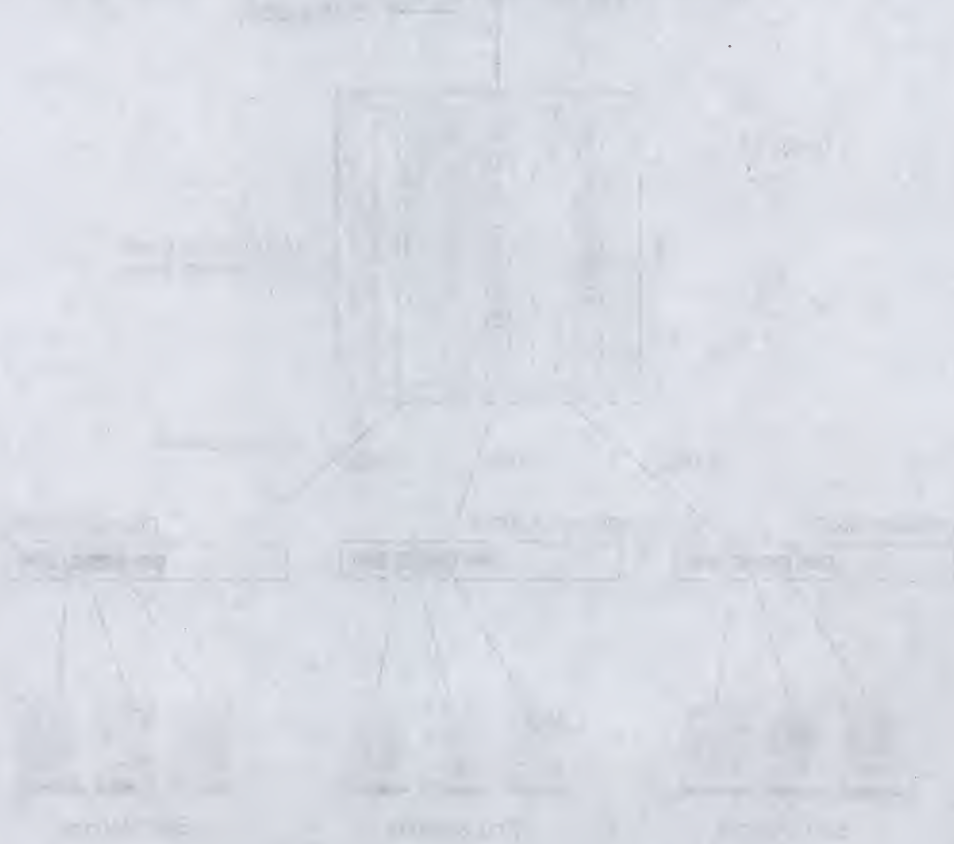
### FDDI Applications/Configurations

DIGITAL provides a full line of FDDI networking products that use passive building wiring to create LANs. LANs allow users at the desktop to access the full computing power of the organization through distributed processing.

The FDDI standard has been developed by ANSI Task Group X3T9 and is an international standard (ISO 9314). It is a 100-Mb/s timed-token, dual counter-rotating ring LAN using fiber-optic or copper UTP/ScTP cabling as the transmission medium.

For a complete list and full descriptions of DIGITAL's high-performance networking products, see the *Network Products Guide*.

This section illustrates the applications and configurations for DIGITAL's FDDI products incorporated in the OPEN DECconnect horizontal wiring subsystem.

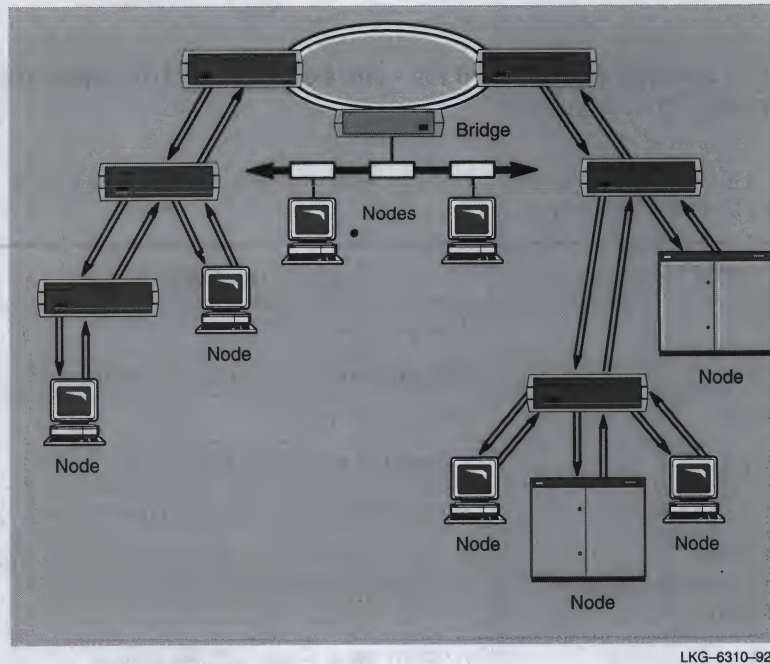




## High-Performance Networks

### Recommended Topologies

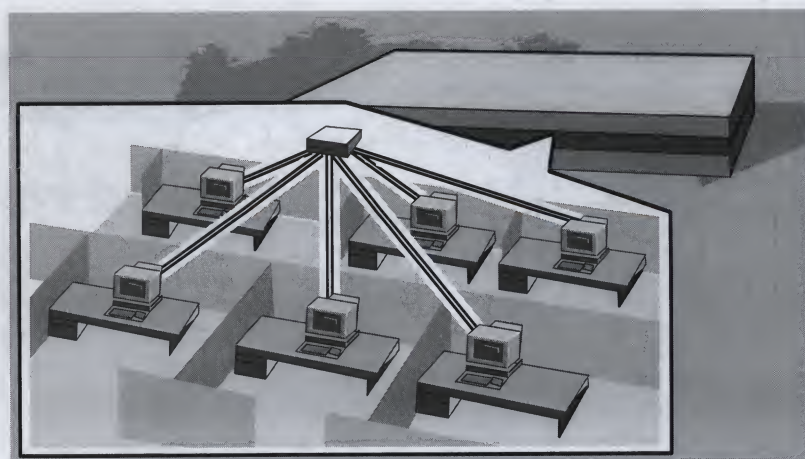
Figure 4-29 shows the dual ring of trees topology. DIGITAL recommends that only network devices under the direct control of the network manager (bridges, routers, and concentrators) should connect to the dual ring of trees.



LKG-6310-92I

**Figure 4-29: Dual Ring of Trees Topology**

The work group wiring concentrator in Figure 4-30 acts as a standalone hub for a work group and provides all the necessary controls to manage the work group configurations.



LKG-6272-92I

**Figure 4-30: Work Group Configuration**



## High-Performance Networks

### DECconcentrator (TP-PMD) UTP Application

Figure 4-32 shows the components and the cabling required to connect from the DECconcentrator in the wiring closet to the work area for a TP-PMD UTP system. Table 4-9 lists the components required to connect the DEFEA DEC FDDIcontroller/EISA to the horizontal distribution subsystem. Figure 4-31 shows the end-to-end pin wiring for this application.

#### Note

For a complete description of the available DEChub FDDI components, see the *Network Products Guide*.

Table 4-9: Parts List for Cabling Components

Item	Part Number	Description	Page
1	UTP	Wiring concentrator	NA
2	BN25G-xx	High-performance data grade patch cable	3-11
3	H3108-PA	Patch panel frame	3-2
4	H3117-LA	8-pin MJ to 110 punchdown insert	3-3
5	H8245-C/H8246-C	High-performance data grade building wire	3-16
6	H3111-C or H3111-GA/GB/GC and H3112-G/H	Modular faceplate, kit of eight or modular wallbox and 8-pin MJ data connector	3-7 3-7 3-7
7	BN25H-03	TP-PMD office cable with crossover	3-11
8	DEFEA-UB	DEC FDDIcontroller/EISA UTP	NA

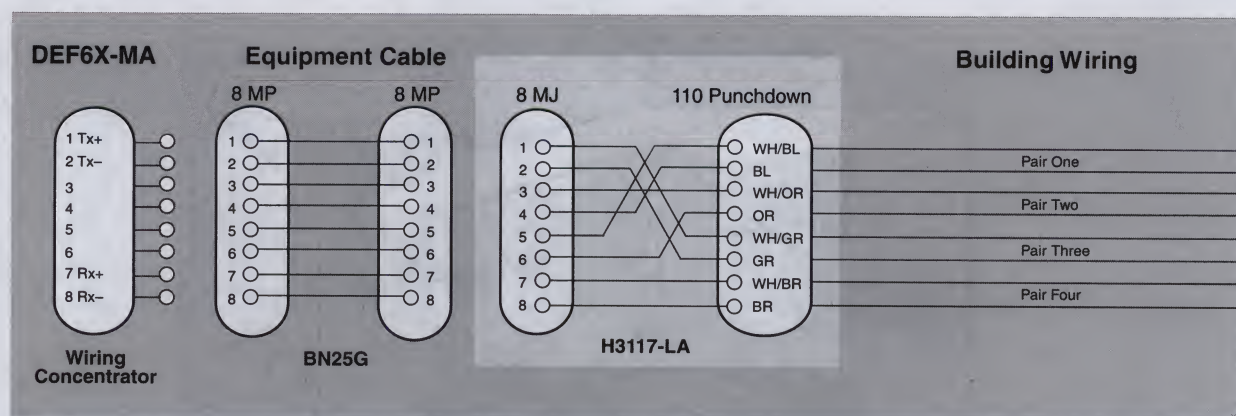


Figure 4-31: OPEN DECconnect Wiring for TP-PMD UTP Transmission



## High-Performance Networks

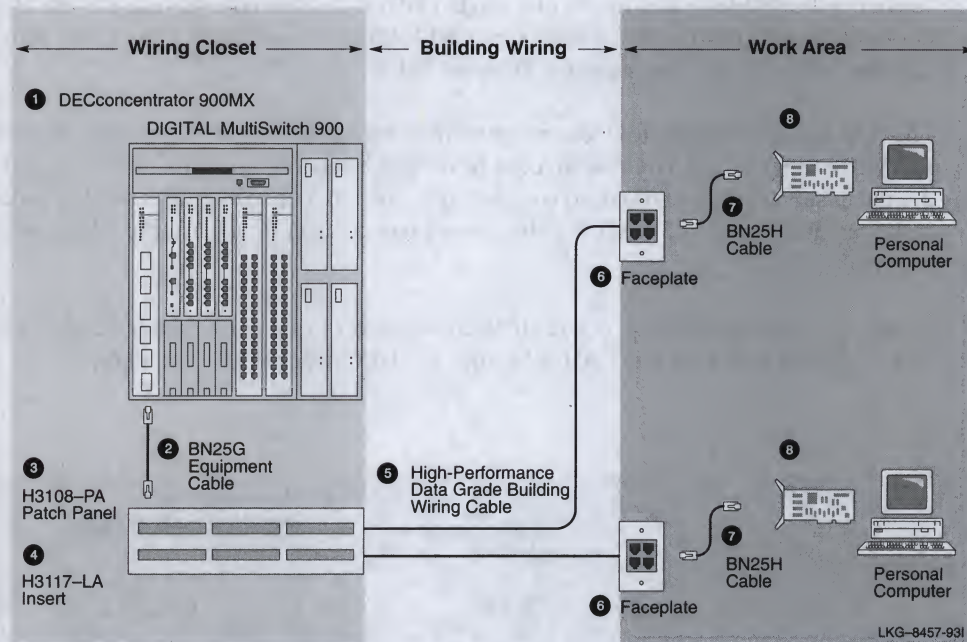
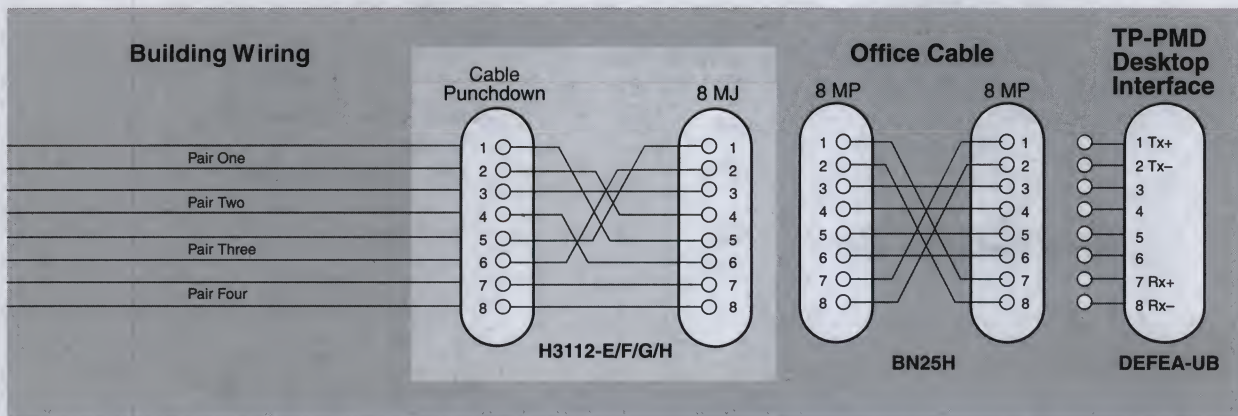


Figure 4-32: DECconcentrator 900MX with Six UTP Ports





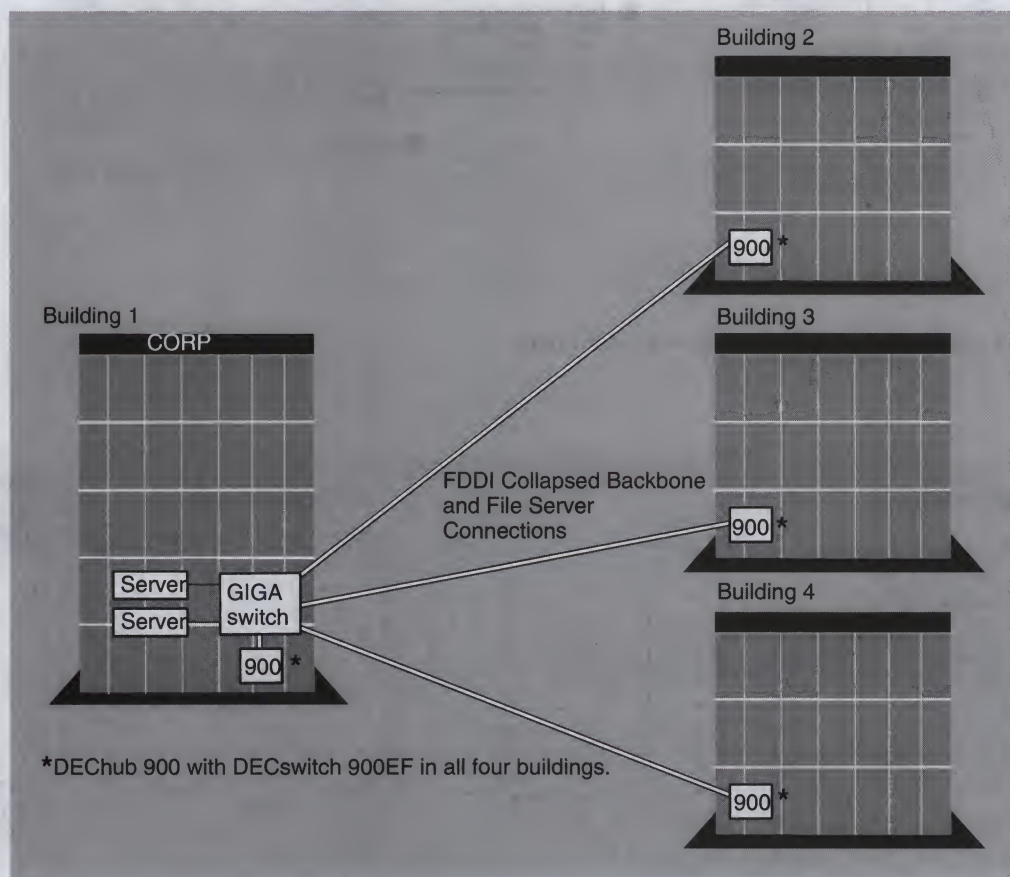
## High-Performance Networks

### GIGAswitch Application

The GIGAswitch system creates switched point-to-point networks out of FDDI technology. It also allows users to build a switched FDDI network in which the aggregate LAN bandwidth is much greater than the individual link bandwidth. Thus, the GIGAswitch FDDI networks are no longer limited to the 100 Mb/s bandwidth of a single FDDI ring. The GIGAswitch system offers scalability that cannot be met by shared access channel LANs, such as FDDI rings, Token Ring, or Ethernet. GIGAswitch also supports ATM and FDDI.

The GIGAswitch system provides enterprise networking, serving as an integration point for LAN and WAN connections. GIGAswitch can be used in a network infrastructure to support multivendor client/server configurations, to connect high-performance workgroups and high-speed collapsed backbones, and to serve as the cluster interconnect for a cluster of Alpha and/or VAX systems.

Figure 4-33 shows a GIGAswitch centralized file server in support of a three-building campus FDDI network with DEChub 900 backplanes and DECswitch 900EF switches.



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**Figure 4-33: FDDI Network with GIGAswitch and DEChub 900 Backplanes**



**This page is for notes.**

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## DIGITAL MultiSwitch 900 Configuration Examples

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This chapter describes the DIGITAL MultiSwitch 900 (formerly called the DEChub 900 MultiSwitch) power system and provides a set of tables that show module comparisons and product features.



## Hub Structured Networking

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### Hub Power System Overview

The hub power system has one to four power supply modules and a Hub Manager that monitors and polls each power supply for identification and status.

The hub power system allows for the installation of incremental power supply modules as the hub system grows. Up to four power supply modules can be added to the hub with all power supply modules sharing power delivery to the chassis and to the network modules on a common bus.

Fully configuring a DIGITAL MultiSwitch 900 with half-height network modules only requires a single power supply module. By adding an extra power supply module beyond what's necessary to power the hub with installed network modules, redundancy is provided to the power system.

Power supply modules can be hot swapped while the DIGITAL MultiSwitch 900 is operating. This allows users to remove faulty power supply modules, add extra power supply modules, or move power supply modules to other slots.

### Power Allocation

The power system allocates power to the chassis and the network modules based on the following priorities:

- The chassis, including the Hub Manager, receives power
- All half-height network modules installed in the chassis receive power immediately at powerup
- Available power is allocated to full-height modules from right (slot 8) to left (slot 1)
- Newly installed half-height network modules receive power immediately. If sufficient power is unavailable for a newly installed half-height network module, a full-height module that is currently powered in the lowest slot is disabled. This enables the power to be supplied to the newly inserted half-height module
- Newly installed full-height network modules receive power only after the Hub Manager determines that sufficient power is available. If sufficient power is unavailable for a full-height network module, a full-height module that is currently powered in the lowest slot is disabled. This enables power to be supplied to the newly inserted full-height module

General power system configuration guidelines are:

- One power supply module is enough for any DIGITAL MultiSwitch 900 with only half-height modules
- Two power supply modules are usually needed when more than one full-height network module is installed
- Three power supply modules are sufficient for any configuration without N+1 redundancy
- Four power supply modules support any configuration and N+1 redundancy



## Hub Structured Networking

### Guidelines for Calculating Power Needs

The DIGITAL MultiSwitch 900 power supply module is an output load sharing 140-watt power supply. The combination of 5- and 15-volt power outputs exceeds the 140-watt power rating. This power difference gives the 140-watt power supply the flexibility of supplying the desired 5- and 15-volt power demands to various hub configurations.

Table 5-1 shows an example of calculating exact hub power needs.

**Table 5-1: Power Calculation Example**

Component	+5 V Current	+15 V Current	Total Power
Power Supply Module (each)	26.0 A (max)	4.0 A (max)	140 W
Chassis	3.0 A	0.0 A	15 W
Half-Height Modules, no AUI (each)	1.4 A	0.0 A	7 W
Half-Height Modules with AUI (each)	1.4 A	0.5 A	14 W
DECserver 900TM	4.0 A	0.5 A	26 W
DECrepeater 900TM	5.0 A	0.5 A	31 W
DECconcentrator 900MX	8.0 A	0.6 A	49 W
Future Network modules (as needed)	—	—	—



## Comparison Tables

The following definitions apply to the comparison tables.

- RS-232 — Standard that specifies slow-speed connection between two computers or a computer and a terminal.
- EIA 423-A — A signaling interface that runs on twisted-pair data cables to support terminal-to-host communications.

The following legend applies to all of the tables in this chapter.

Legend		
<b>AUI</b> = Attachment unit interface (15-pin D-sub)	<b>FLEX</b> = Assignable backplane channel	<b>S</b> = Switch
<b>B</b> = Bridge	<b>FO</b> = Fiber optic	<b>SAS</b> = Single attachment station
<b>BR</b> = Brouter	<b>H-H</b> = Half-height	<b>STP</b> = Shielded twisted-pair 100-ohm
<b>Ethernet</b> = Ethernet	<b>Power</b> (in amperes) required at 5V = Five volts 12/15V = Twelve or fifteen volts	<b>TR</b> = Token Ring
<b>Ext. Ports</b> = Number of External Ports	<b>R</b> = Router	<b>TP</b> = Twisted-pair (UTP/ScTP)
<b>F-H</b> = Full height	<b>RU</b> = Router upgradable	<b>TW</b> = ThinWire

Table 5-2: Comparison of DEChub Hub Products Features

Name	Slots	Data Link Support	Max # Ext. 10BaseT Ports	Power 12 V 5 V 15 V		Backplane Data Characteristics	Management Characteristics
DEChub ONE	1 F-H	Ethernet +	32			Ethernet AUI	Setup port OBM port.
DEChub ONE-MX	1 F-H	Ethernet FDDI +	32			Ethernet, AUI, FDDI/ModPMDs	Setup port OBM port.
DEChub 90	8 H-H	Ethernet	128	16	1	Ethernet TW only	DENMA required for SNMP management. May need Work-Group Bridge for DEC repeater 90 series of repeaters.
DIGITAL MultiSwitch 900	8 H-H or F-H	All Flex Channels Ethernet TR FDDI	256	N+1 Power system 420 W 78 A@5 V 12 A@15 V (Max)		Ethernet, TR, FDDI, Flexible Interconnect (others possible)	Hub SNMP Management Agent built in with LCD display. Power management. Setup port, OBM port.



## Ethernet

Table 5-3: Comparison of DEChub Ethernet Product Features

Name	Ext. Media	Ext. Ports	Size	Power 5 V 15 V		Backplane Data Characteristics	Management Characteristics
DECrepeater 90T+	TP	8	H-H	1.4	0	Ethernet ThinWire only	Requires DENMA on extended LAN for SNMP management in DEChub 901.
DECrepeater 90T-16	TP	16	H-H	1.2	0	Ethernet ThinWire only	Requires DENMA on extended LAN for SNMP management in DEChub 901.
DECrepeater 90TS	TP	8	H-H	1.2	0.0	Ethernet ThinWire and/or flexible channel	SNMP Agent.
DECrepeater 90C	TW	6	H-H	1.4	0	Ethernet ThinWire only	Same as DECrepeater 90T1.
DECrepeater 90FL	TW FO	4	H-H	1.4	0.5	Ethernet ThinWire only	Same as DECrepeater 90T1.
DECrepeater 90FA	TW AUI FO	1 1 1	H-H	1.4	0.5	Ethernet ThinWire only	Same as DECrepeater 90T1.
DECrepeater 90FS	AUI FO	1 2	H-H	1.5	0.5	Ethernet ThinWire and/or 1 flexible channel	SNMP Agent.
DECrepeater 900GM	TP AUI	24 1	F-H	4.0	0.5	Ethernet ThinWire and/or 1 of 6 backplane ethernet interconnects	SNMP Agent.
DECrepeater 900TM	TP	32	F-H	4.0	0.5	1 of 6 backplane Ethernet interconnects	SNMP Agent. Per-pair port network assignments.
PORTswitch 900FP	FO	12	F-H	8.0	0.5	Ethernet ThinWire and/or 6 of 6 backplane Ethernet interconnects	SNMP Agent. Per-pair port network assignments.
PORTswitch 900TP	TP	32	F	6.0	0.5	Ethernet ThinWire and/or 6 of 6 backplane Ethernet interconnects	SNMP Agent. Per-pair port network assignments.
PORTswitch 900CP	TW	16	F	8.0	0.5	Ethernet ThinWire and/or 6 of 6 backplane Ethernet interconnects	SNMP Agent. Per-pair port network assignments.

<sup>1</sup>Requires a local DECbridge 90 or DECbridge 90FL in the DEChub 90



## Token Ring

Table 5-4: Comparison of DEChub Token Ring Product Features

Name	Media	Ext. Lobes	Size	Power 5 V 15 V		Backplane Data Characteristics	Code	Management Characteristics
DECmau 900TL	TR	8	H-H	0.9	0	2 TR (Either 4 or 16 Mb/s)		Limited SNMP
DECmau 900TH	TR UTP	24	F-H	3.0	0.4	2 TR (Either 4 or 16 Mb/s)		Limited SNMP
Token Ring Repeaters								
DECrepeater 900TL	TP 100-ohm 150 STP	1	H-H	1.2	0	1 of 2 TR (Either 4 or 16 Mb/s)		Limited SNMP
DECrepeater 900SL	TR	1	H-H	1.2	0	1 of 2 TR (Either 4 or 16 Mb/s)		Limited SNMP



**FDDI****Table 5-5: Comparison of DEChub FDDI Product Features**

Name	Media	Ext. Ports	Size	Power		Backplane Data Characteristics	Management Characteristics
				5 V	15 V		
DECconcentrator 900MX	Modular <sup>1</sup>	6 SAS or 4 SAS and 2 A-B	F-H	7.0	0.5	2 FDDI connections on any MultiSwitch channel	SNMP Agent
DECconcentrator 900TH	2 Modular; 14 UTP	16 SAS or 14 SAS and 2 A-B	F-H	8.6	0.5	2 FDDI connections on any MultiSwitch channel	SNMP Agent
DECconcentrator 900F-H	2 Modular; 14 FO-SC	16 SAS or 14 SAS and 2 A-B	F-H	9.5	0.5	2 FDDI connections on any MultiSwitch channel	SNMP Agent
<sup>1</sup> Supports Modular Physical Media Dependent interfaces (ModPMDs) in any combination of the following available interfaces on each of six ports: <ol style="list-style-type: none"> <li>1. Multimode Optics</li> <li>2. Single Mode Optics</li> <li>3. UTP</li> </ol>							



## Communication Servers

Table 5-6: Comparison of DEChub Communication Server Features

Name	Media	Ext. Ports	Port Characteristics	Size	Power		Backplane Data Characteristics	Management Characteristics
					5 V	15 V		
DECserver 90L	DEC 423	8 MMJ	LAT 1 session per port. Max baud rate = 38.4 Kb/s	H-H	1.4	0	Ethernet, ThinWire	TSM
DECserver 90L+	DEC 423	8 MMJ	Up to 4 LAT sessions per port. Max baud rate = 38.4 Kb/s	H-H	1.4	0	Ethernet, ThinWire	TSM
DECserver 90TL1	DEC 423	8 MJ8	Up to 8 LAT, Telnet, or SLIP sessions per line. Max baud rate = 38.4 Kb/s	H-H	1.4	0	Ethernet, ThinWire	TSM
DECserver 90M1	DEC 423	8 MJ8	Up to 8 LAT, Telnet, or SLIP sessions per line. Max baud rate = 56 Kb/s	H-H	1.4	0	Ethernet, ThinWire	TSM, SNMP Agent
DECserver 900TM2	DEC 423 PMC	32 MJ8	Up to 8 LAT, Telnet, or SLIP sessions per line. Max baud rate = 115.2 Kb/s	F-H	4.0	0.5	Ethernet, ThinWire, and/or 1 of 6 IMBs	TSM, SNMP Agent
DECserver 900GM2	DEC 423 PMC	4-68 Pin (32 Ports)	Up to 8 LAT, Telnet, or SLIP sessions per line. Max baud rate = 115.2 Kb/s		4.0	0.5	Ethernet, ThinWire, and/or 1 of 6 IMBs	TSM, SNMP Agent

<sup>1</sup>DTR, DSR control only. <sup>2</sup>Modem control is defined, see specific product documentation.



## Internetworking

Table 5-7: Comparison of DEChub Bridge, Switch, and Router Features

Name	LAN Media	External WAN Ports	Size	Power		Backplane Data Characteristics	Product Description
				5 V	15 V		
DEC WANrouter 90		1-E 128K	H-H	1.4	0	Ethernet, ThinWire	One serial port to WAN. Multiport router to LAN/WAN via serial line.
DECbrouter 90T1		1-E/T1/E1	H-H	1.4	0.7	Ethernet, ThinWire	
DECbrouter 90T2		1-E/T1/E1 64K	H-H	1.4	0.7	Ethernet, ThinWire	2 WAN port Ethernet Brouter (runs Cisco code); 1 serial port to WAN
DECbrouter 90T2A		1-E/T1/E1 64K	H-H	1.4	0.7	Ethernet, ThinWire	2 WAN port Ethernet Brouter (runs Cisco code); 1 serial port to WAN
RouteAbout EW		1-E 2-T1/E1					
RouteAbout TW		1-E 2-T1/E1					
RouteAbout EI		1-E/T1/E1 1-ISDN					
Leaf Bridge	TW	1 64K	H-H	1.4	0	Ethernet, ThinWire	1 WAN port Ethernet bridge
DECbridge 90	TW AUI	1	H-H	1.4	.75	Ethernet, ThinWire	RBMS inband management. TW/AUI to Ethernet backbone. TW only to work group. Supports 200 nodes to work group.
DECbridge 90FL	AUI FO	1	H-H	1.4	.75	Ethernet, ThinWire	RBMS inband management. User-selectable AUI/FO interface to backbone. ThinWire only to work group.
DECswitch 900EE	AUI TP	2 4	F-H	8.0	1.5	Ethernet ThinWire and/or 6 of 6 backplane ethernet interconnects	SNMP Agent. RMON upgradable.
DECswitch 900EF	AUI TP FDDI-FO	2 4 1	F-H	8.0	1.5	Ethernet ThinWire and/or 6 of 6 backplane ethernet interconnects	SNMP Agent. RMON upgradable.
DECswitch 900ET	AUI TP	1	F-H	8.0	1.5	Ethernet Token Ring	SNMP Agent. RMON upgradable. Router upgradable.
PEswitch 900TX	TP	6	F-H	8.0	0.7	Ethernet ThinWire and/or 6 of 6 backplane ethernet interconnects	SNMP Agent. RMON upgradable.



## Management Products

**Table 5-8: Comparison of DEChub Management Product Features**

Name	Media	External Ports	Size	Power		Backplane Data Characteristics	Product Description
				5 V	15 V		
DECagent 90	N/A	0	H-H	1.4	0.5	Ethernet, ThinWire	Common SNMP management proxy agent for the workgroup modules in the hub.
DECpacketprobe 90	TP	1	H-H	0.8	0.0	Ethernet, ThinWire	Ethernet RMON agent.
DECpacketprobe 900RR	TP	1 TR	H-H	1.4	0.0	Token Ring A or B	Token Ring RMON agent.











## Appendix A

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Appendix A-E contains additional technical data, ordering information, and lists of reference materials. Appendix A illustrates miscellaneous pin-pair diagrams.



## Appendix A. Octopus Cables and Connecting Hardware Pinout Tables

Table A-1: H3117-M/MA, H3107-M, and BN26R Octopus Cable 8-Pin MJ/MP to 50-Pin Patch Panel Pinout

8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number		8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number
1	1	27		2	1	30
	2	2			2	5
	3	26			3	29
	4	NC			4	NC
	5	NC			5	NC
	6	1			6	4
	7	28			7	31
	8	3			8	6

8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number		8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number
3	1	33		4	1	36
	2	8			2	11
	3	32			3	35
	4	NC			4	NC
	5	NC			5	NC
	6	7			6	10
	7	34			7	37
	8	9			8	12

Note: NC = No connection.



**Table A-1: H3117-M/MA, H3107-M, and BN26R Octopus Cable 8-Pin MJ/MP to 50-Pin Patch Panel Pinout (Cont.)**

8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number		8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number
5	1	39		6	1	42
	2	14			2	17
	3	38			3	41
	4	NC			4	NC
	5	NC			5	NC
	6	13			6	16
	7	40			7	43
	8	15			8	18

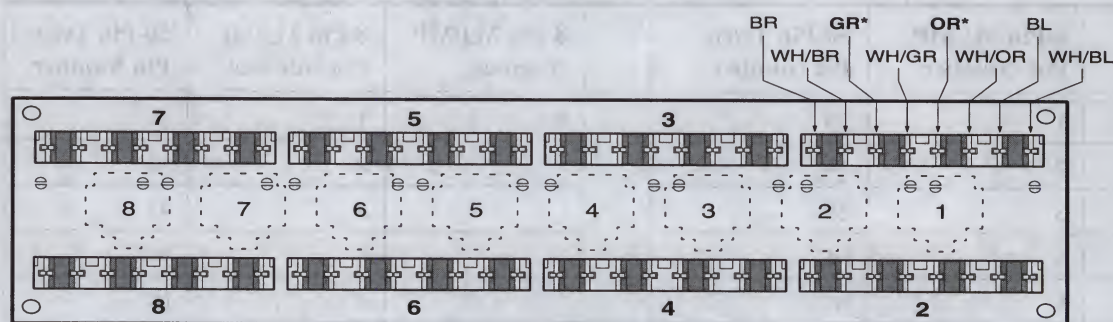
8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number		8-Pin MJ/MP Number	8-Pin MJ/MP Pin Number	50-Pin Telco Pin Number
7	1	45		8	1	48
	2	20			2	23
	3	44			3	47
	4	NC			4	NC
	5	NC			5	NC
	6	19			6	22
	7	46			7	49
	8	21			8	24

Note: NC = No connection.



## Appendix A. Octopus Cables and Connecting Hardware Pinout Tables

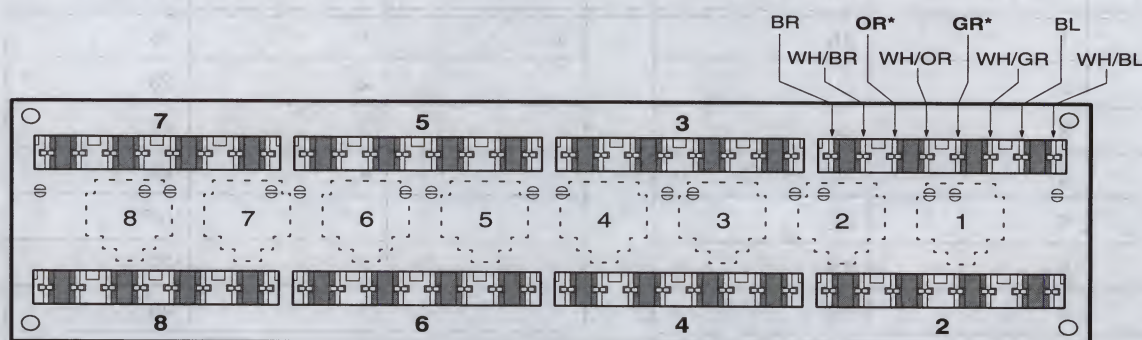
### H3117-LA/LB/LE Connector Pinout EIA/TIA-568 (T568A)



LKG-8903-941

Figure A-1. H3117-LA/LB/LE Connector Pinout EIA/TIA-568 (T568A) — Rear View

### H3117-LC/LD/LF Connector Pinout EIA/TIA-568 (T568B)



LKG-8939-941

Figure A-2. H3117-LC/LD/LF Connector Pinout EIA/TIA-568 (T568B) — Rear View



## Appendix A. Octopus Cables and Connecting Hardware Pinout Tables

Table A-2: BN24K 50-Pin to 36-Pin Equipment Cable Pinout

50-Pin Connector P1	36-Pin Connector P2	Line Number	Signal Name	Insulation Color	Twisted-pair Number
P1-1	P2-1	0	Transmit+	Blu/Wht	1
P1-26	P2-19	0	Transmit-	Wht/Blu	1
P1-2	P2-2	0	Receive+	Org/Wht	2
P1-27	P2-20	0	Receive-	Wht/Org	2
P1-4	P2-3	1	Transmit+	Grn/Wht	3
P1-29	P2-21	1	Transmit-	Wht/Grn	3
P1-5	P2-4	1	Receive+	Brn/Wht	4
P1-30	P2-22	1	Receive-	Wht/Brn	4
P1-7	P2-5	2	Transmit+	Slit/Wht	5
P1-32	P2-23	2	Transmit-	Wht/Slit	5
P1-8	P2-6	2	Receive+	Blu/Red	6
P1-33	P2-24	2	Receive-	Red/Blu	6
P1-10	P2-7	3	Transmit+	Org/Red	7
P1-35	P2-25	3	Transmit-	Red/Org	7
P1-11	P2-8	3	Receive+	Grn/Red	8
P1-36	P2-26	3	Receive-	Red/Grn	8
P1-13	P2-9	4	Transmit+	Brn/Red	9
P1-38	P2-27	4	Transmit-	Red/Brn	9
P1-14	P2-10	4	Receive+	Slit/Red	10
P1-39	P2-28	4	Receive-	Red/Slit	10
P1-16	P2-11	5	Transmit+	Blu/Blk	11
P1-41	P2-29	5	Transmit-	Blk/Blu	11
P1-17	P2-12	5	Receive+	Org/Blk	12
P1-42	P2-30	5	Receive-	Blk/Org	12
P1-19	P2-13	6	Transmit+	Grn/Blk	13
P1-44	P2-31	6	Transmit-	Blk/Grn	13
P1-20	P2-14	6	Receive+	Brn/Blk	14
P1-45	P2-32	6	Receive-	Blk/Brn	14
P1-22	P2-15	7	Transmit+	Slit/Blk	15
P1-47	P2-33	7	Transmit-	Blk/Slit	15
P1-23	P2-16	7	Receive+	Blu/Yel	16
P1-48	P2-34	7	Receive-	Yel/Blu	16



## Appendix A. Octopus Cables and Connecting Hardware Pinout Tables

Table A-3: BN24L 6-Pin MMP to 50-Pin Equipment Cable Pinout

6-Pin MMP Position Num- ber	6-Pin MMP Pin Number	50-Pin Telco Pin Number		6-Pin MMP Position Number	6-Pin MMP Pin Number	50-Pin Telco Pin Number
#1	3	26		#5	3	38
	2	1			2	13
	4	27			4	39
	5	2			5	14
	1	28			1	40
	6	3			6	15
#2	3	29		#6	3	41
	2	4			2	16
	4	30			4	42
	5	5			5	17
	1	31			1	43
	6	6			6	18
#3	3	32		#7	3	44
	2	7			2	19
	4	33			4	45
	5	8			5	20
	1	34			1	46
	6	9			6	21
#4	3	35		#8	3	47
	2	10			2	22
	4	36			4	48
	5	11			5	23
	1	37			1	49
	6	12			6	24



## Appendix A. Octopus Cables and Connecting Hardware Pinout Tables

Table A-4: BN24N 8-Pin MP to 36-Pin Equipment Cable Pinout

8-Pin MP Position Number	8-Pin MP Pin Number	36-Pin Telco Pin Number	18-Pair Color Code		8-Pin MP Position Number	8-Pin MP Pin Number	36-Pin Telco Pin Number	18-Pair Color Code
#1	3	19	Wht/Org		#5	3	27	Wht/Org
	6	1	Org/Wht			6	9	Org/Wht
	1	20	Wht/Grn			1	28	Wht/Grn
	2	2	Grn/Wht			2	10	Grn/Wht
#2	3	21	Wht/Org		#6	3	29	Wht/Org
	6	3	Org/Wht			6	11	Org/Wht
	1	22	Wht/Grn			1	30	Wht/Grn
	2	4	Grn/Wht			2	12	Grn/Wht
#3	3	23	Wht/Org		#7	3	31	Wht/Org
	6	5	Org/Wht			6	13	Org/Wht
	1	24	Wht/Grn			1	32	Wht/Grn
	2	6	Grn/Wht			2	14	Grn/Wht
#4	3	25	Wht/Org		#8	3	33	Wht/Org
	6	7	Org/Wht			6	15	Org/Wht
	1	26	Wht/Grn			1	34	Wht/Grn
	2	8	Grn/Wht			2	16	Grn/Wht

Table A-5: H3106-A 36-Pin to 50-Pin Adapter Pinout

36-Pin D-Connector	50-Pin D-Connector		36-Pin D-Connector	50-Pin D-Connector
1	2		19	27
2	3		20	28
3	5		21	30
4	6		22	31
5	8		23	33
6	9		24	34
7	11		25	36
8	12		26	37
9	14		27	39
10	15		28	40
11	17		29	42
12	18		30	43
13	20		31	45
14	21		32	46
15	23		33	48
16	24		34	49



**Appendix A. Octopus Cables and Connecting Hardware Pinout Tables****Table A-6: BC29P 9-Pin D-Sub to 25-Pin D-Sub (Modem) Out-of-Band Management Cable for DEChub 900 MultiSwitch**

Signal Name	DB9 (Female)	DB25 (Male)
Received line signal detect	1	8
Received data	2	3
Transmitted data	3	2
DTE ready	4	20
Signal common	5	7
DCE ready	6	6
Request to send/Ready for receiving	7	4
Clear to send	8	5
Ring indicator	9	22
Shield*		1

\*The cable shield must be tied to the metal connector housing at the DB9 on both ends. The shield must not be connected to any other signal in the cable.

**Table A-7: BC29Q 9-Pin D-Sub to 9-Pin D-Sub (PC) Out-of-Band Management Cable for DEChub 900 MultiSwitch**

Signal Name	DB9 (Female)	DB9 (Female)
Received line signal detect	1	4
Received data	2	3
Transmitted data	3	2
DTE ready	4	1
Signal common	5	5
DCE ready	6	4
Request to send/Ready for receiving	7	8
Clear to send	8	7
Ring indicator	9	NC
Shield*		

\*The cable shield must be tied to the metal connector housing at the DB9 on both ends. The shield must not be connected to any other signal in the cable.



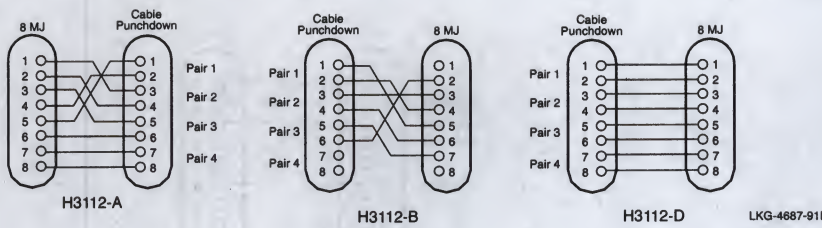


Figure A-3. H3112-A/B/D

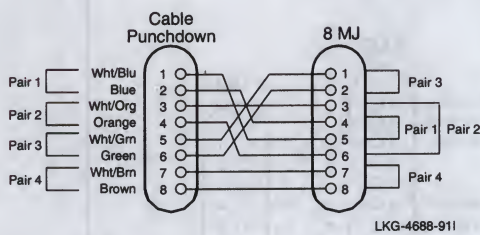


Figure A-4. H3112-E/F

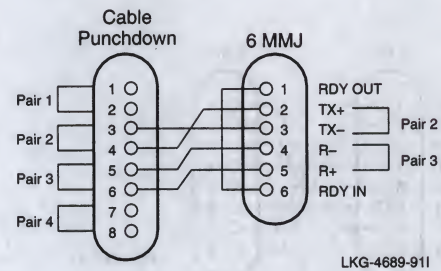


Figure A-7. H3112-A

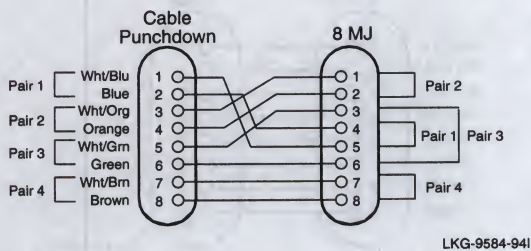


Figure A-5. H3112-IV/JV

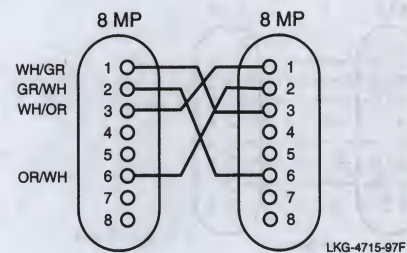


Figure A-8. 8-Pin MP to 8-Pin MP Office Cable (Crossover with Pin/Pair Diagram (BN24F))

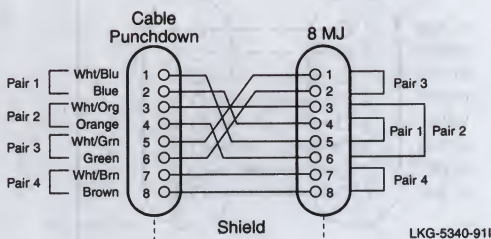


Figure A-6. H3112-GV/HV

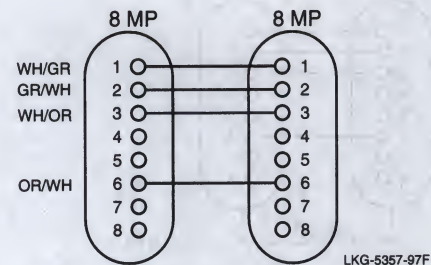


Figure A-9. 8-Pin MP to 8-Pin MP Office Cable (Noncrossover with Pin/Pair Diagram (BN26K))



## Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

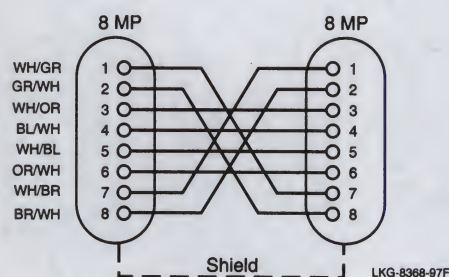


Figure A-10. BN26S Office Cable

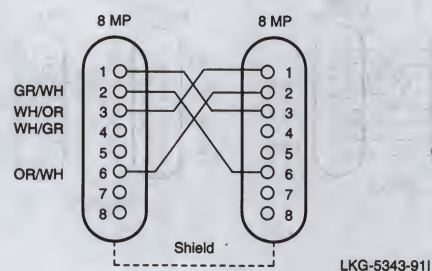


Figure A-14. Shielded 8-Pin MP to 8-Pin MP Office Cable with Crossover (BN26N)

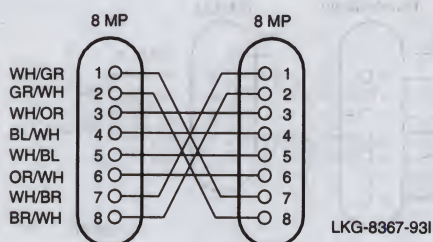


Figure A-11. BN25H Office Cable

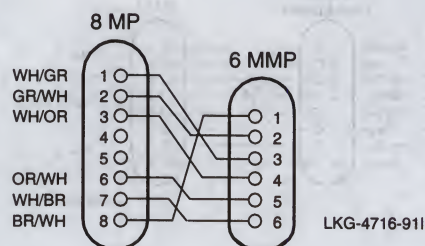


Figure A-15. 6-Pin MMP to 8-Pin MP Office Cable (Crossover) with Pin/Pair Diagram (BN24H)

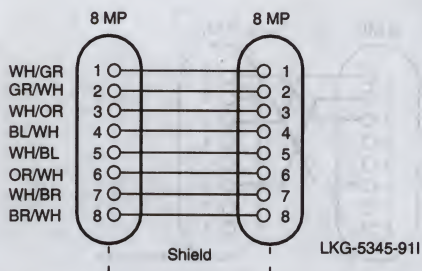


Figure A-12. 8-Pin MP to 8-Pin MP Shielded Equipment/Office Cable (BN26M)

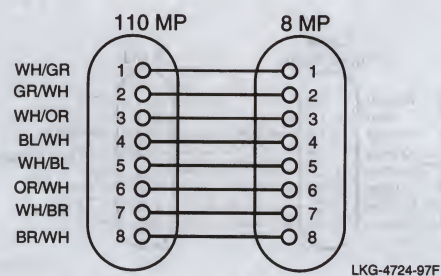


Figure A-16. 110 Punchdown to 8-Pin MP (BN25U)

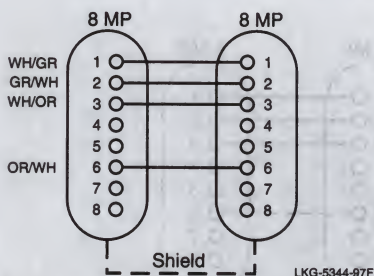


Figure A-13. Shielded 8-Pin MP to 8-Pin MP Office Cable Without Crossover (BN26L)

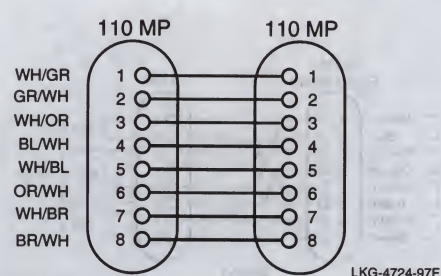
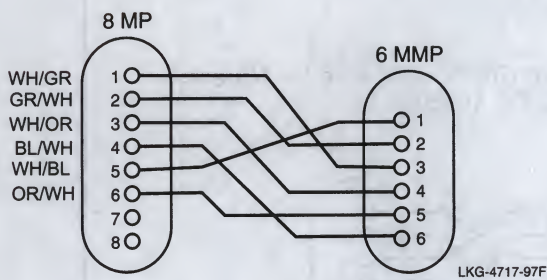


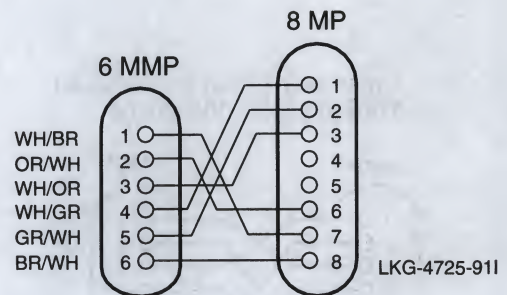
Figure A-17. 110 Punchdown to 110 Punchdown (BN25V)



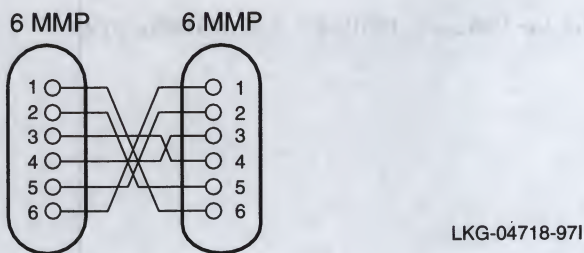
# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



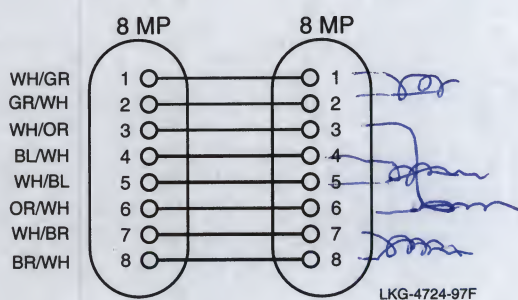
**Figure A-18. 6-Pin MMP to 8-Pin MP Cable Assembly with Pin/Pair Diagram (BC16U)**



**Figure A-21. 6-Pin MMP to 8-Pin MP Equipment Cable with Pin/Pair Diagram (BN24J)**



**Figure A-19. 6-Pin MMP to 6-Pin MMP Terminal Interconnection Cable with Pin/Pair Diagram (BC16E)**

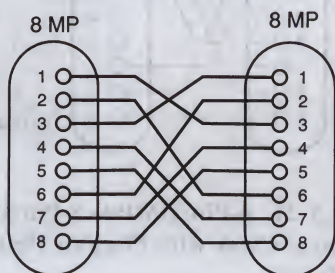


**Figure A-20. 8-Pin MP to 8-Pin MP EIA/TIA 100BaseTX, Category 5 Data Grade Equipment Cable with Pin/Pair Diagram (BN25G)**



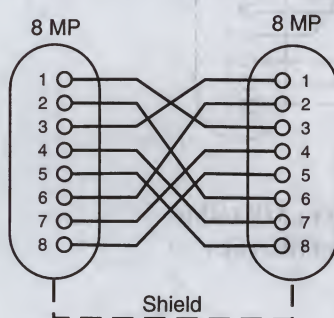
## Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

Crossover Cable for 10BaseT,  
100BaseTX, 100BaseT4



BN24Q

Screened Crossover Cable for 10BaseT,  
100BaseTX, 100BaseT4



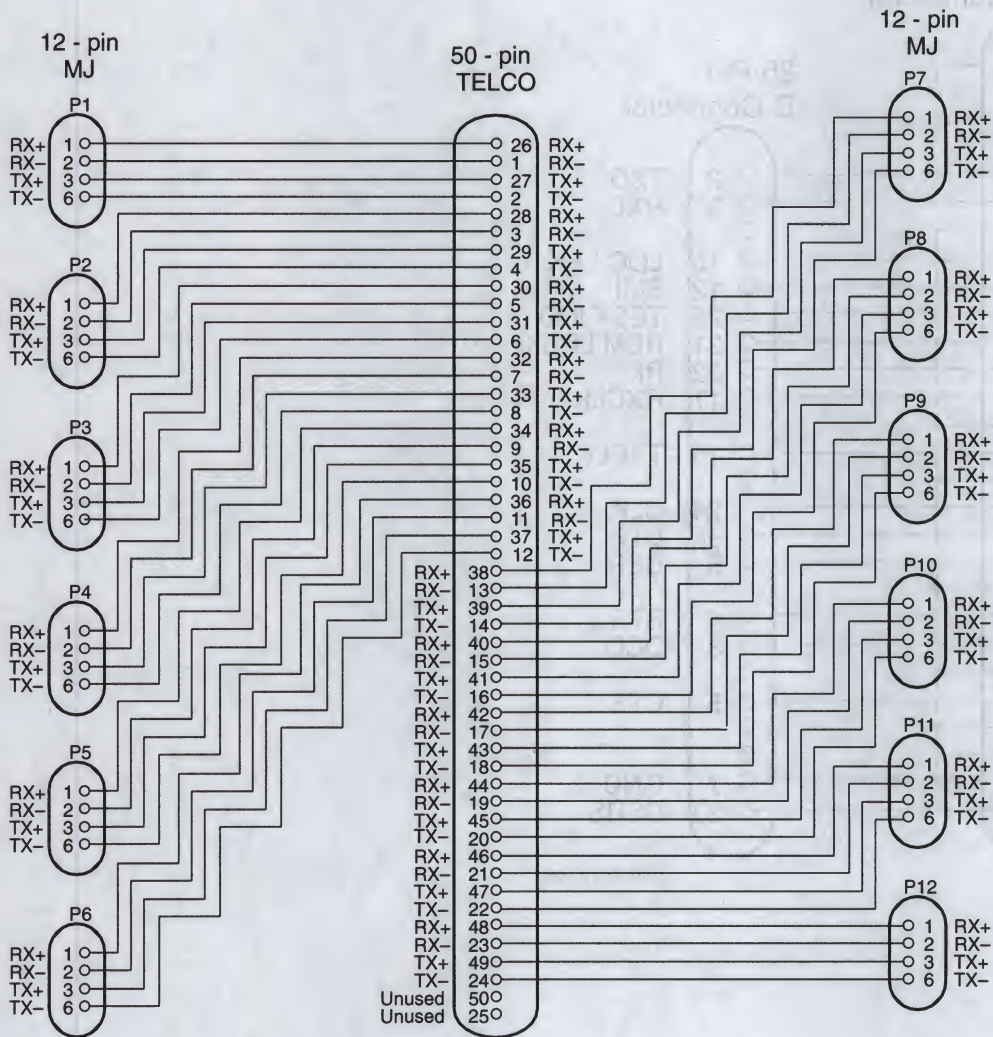
BN28Q

LKG-10176A-97F

Figure A-22. UTP and screened (DTE to DTE) crossover cables for 10BaseT, 100BaseTX, and 100BaseT4



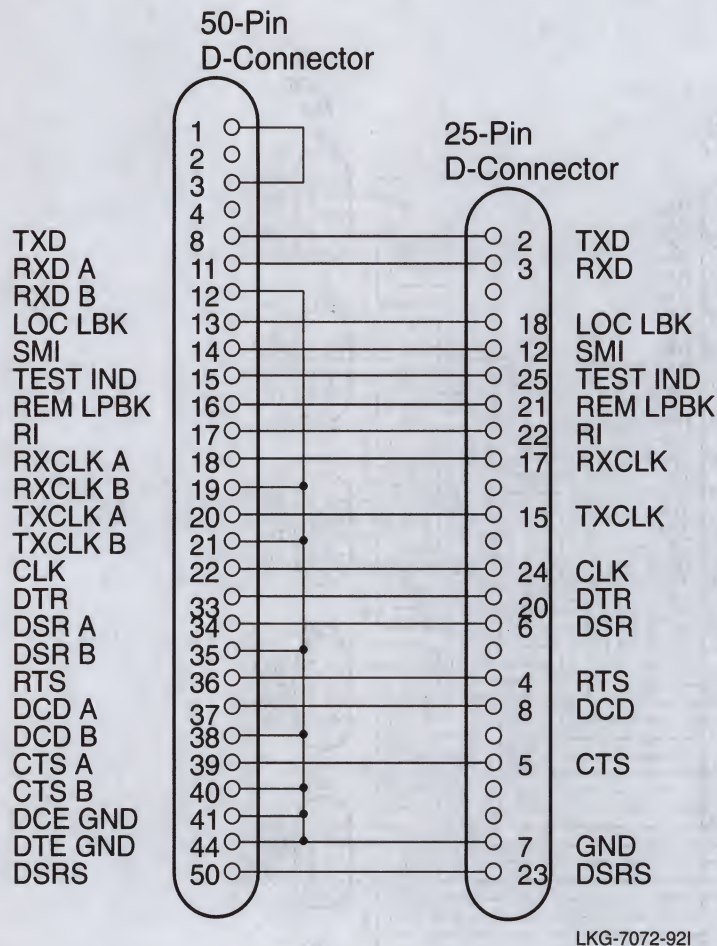
# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



LKG-8928-941

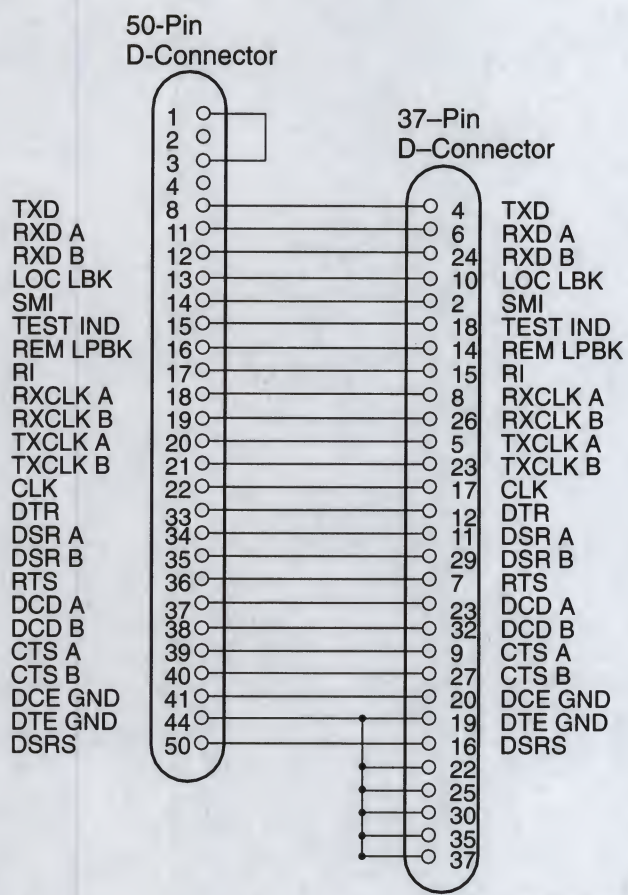
Figure A-23. Pinout for BN26U Cable



**Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables****Figure A-24. Wiring Diagram for BC23V-02, BC19V-02 Cables**



Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



LKG-7074-92I

Figure A-25. Wiring Diagram for BC19E-02 Cable



## Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

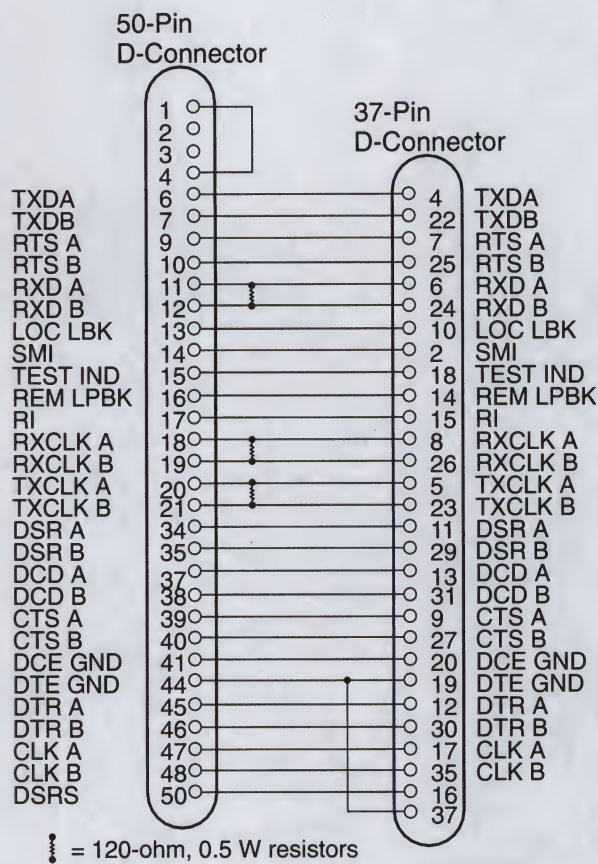


Figure A-26. Wiring Diagram for BC19B-02 Cable



# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

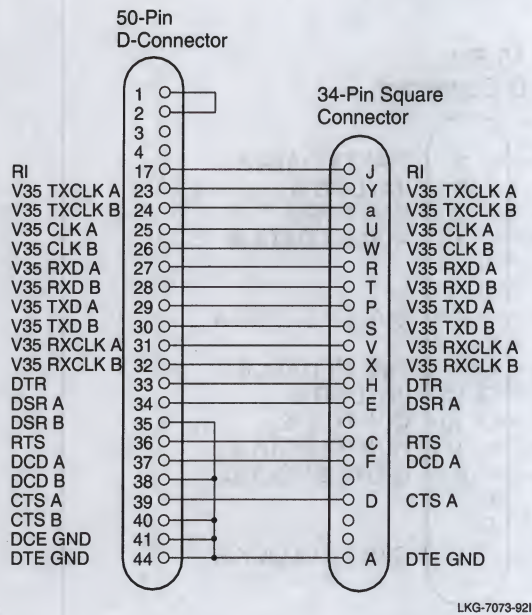


Figure A-27. Wiring Diagram for BC19A-02 Cable

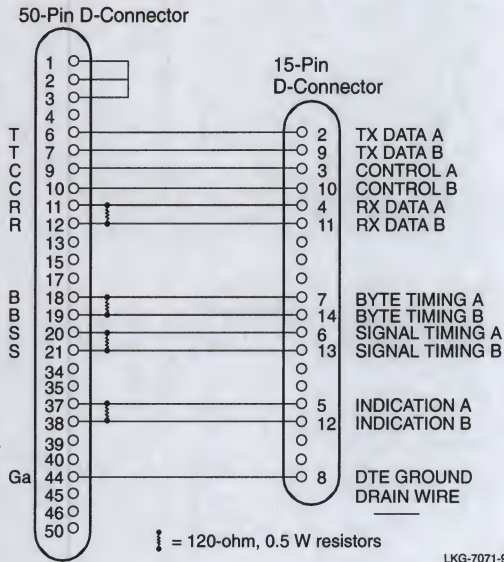


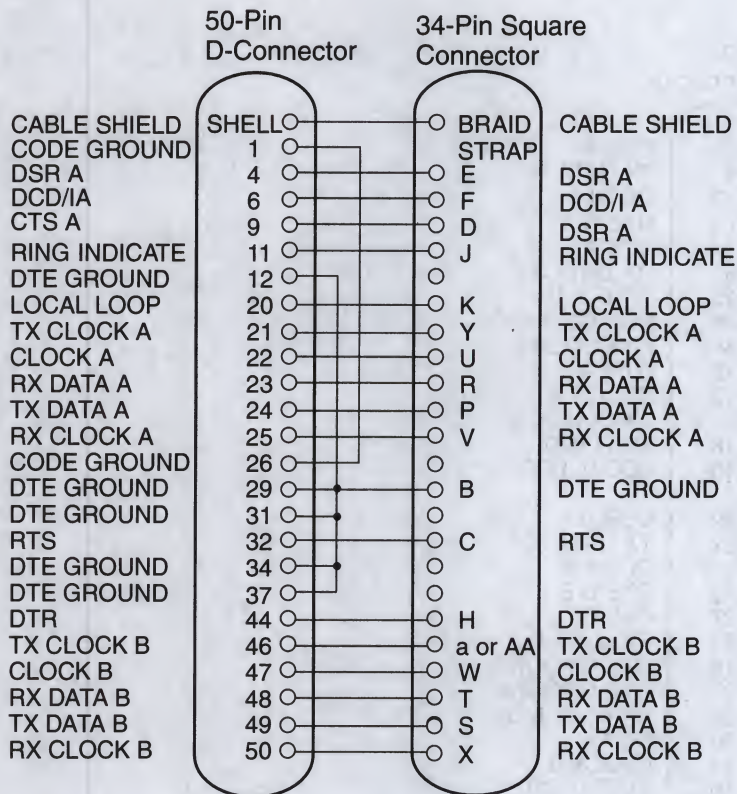
Figure A-28. Wiring Diagram for BC19C-02 Cable







# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



LKG-8362-931

Figure A-30. 50-Pin to 34-Pin D-Sub (BC12G) Cable



# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

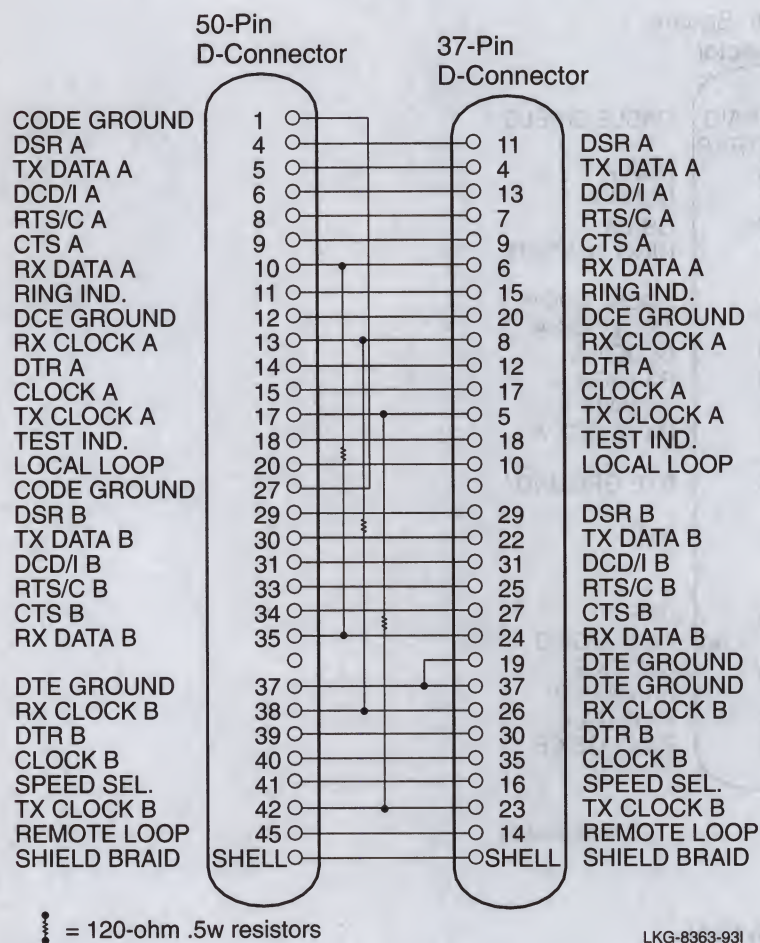
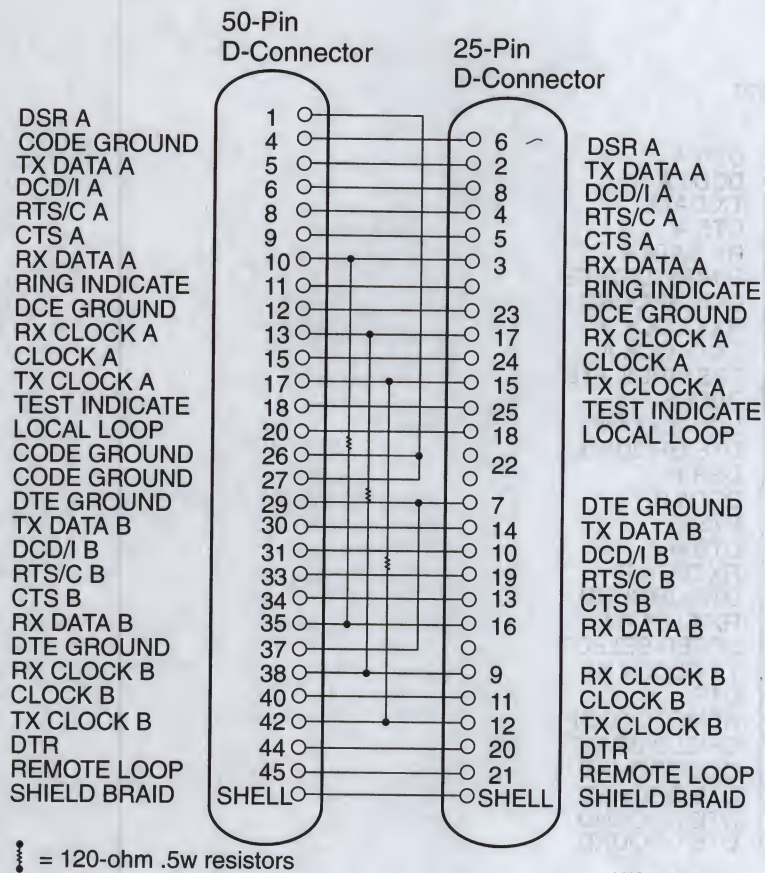


Figure A-31. 50-Pin to 37-Pin D-Sub (BC12H) Cable



## Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

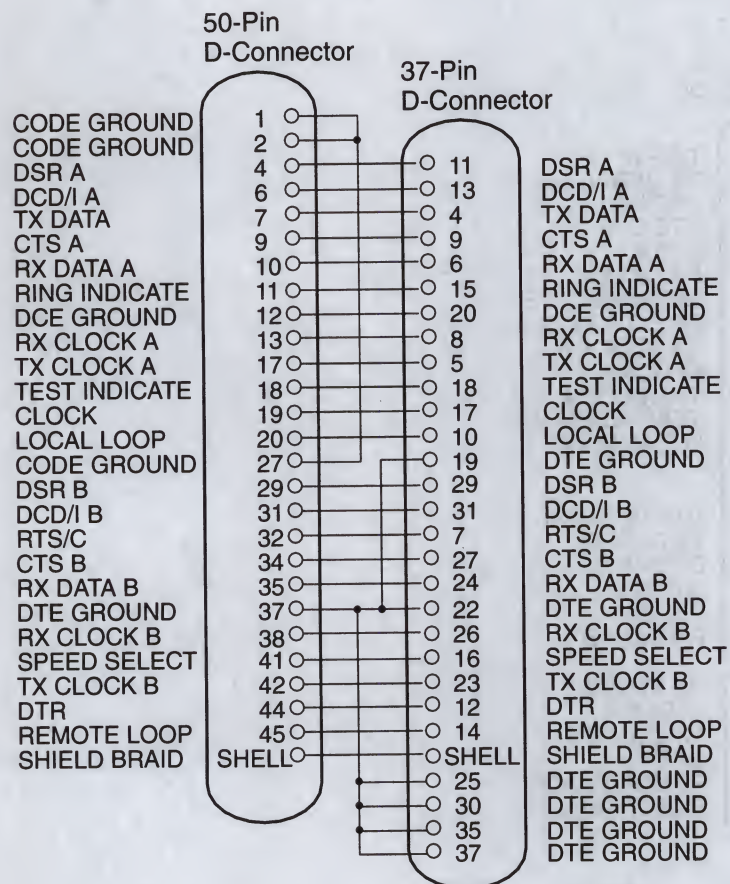


LKG-8364-931

Figure A-32. 50-Pin to 25-Pin D-Sub (BC12J) Cable



# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



LKG-8365-93I

Figure A-33. 50-Pin to 37-Pin D-Sub (BC12K) Cable



# Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables

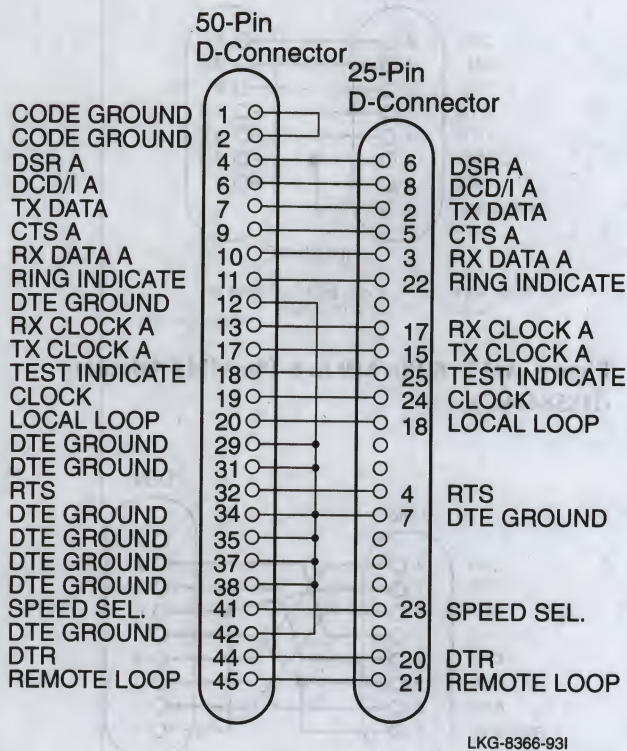
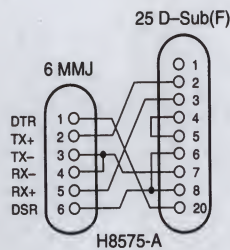


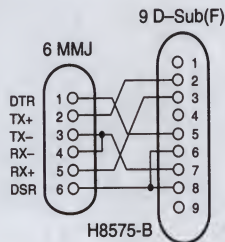
Figure A-34. 50-Pin to 25-Pin D-Sub (BC12L) Cable



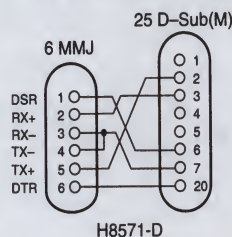
## Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



\*Note: EOS/ESD protection devices are not shown on diagram

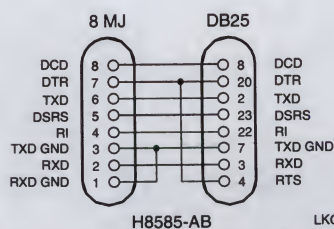


\*Note: EOS/ESD protection devices are not shown on diagram



LKG-4747-911

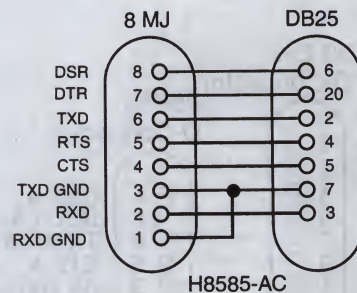
**Figure A-35. EIA-423-A to EIA-232-D Adapters (H8575-A/B, H8571-D)**



LKG-6974-921

\*Note: Not for connection to public networks in Sweden, Germany, or Japan.

**Figure A-36. 8-Pin MJ to DB25 Modem Adapter (H8585-AB)**

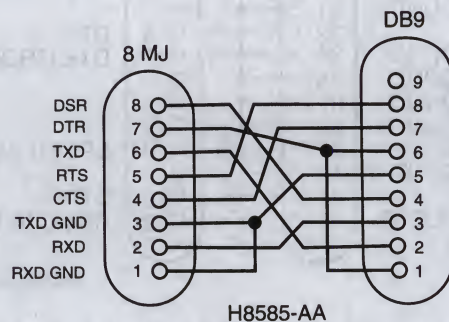


H8585-AC

\*Note: Not for connection to public networks in Sweden, Germany, or Japan.

LKG-6975-97F

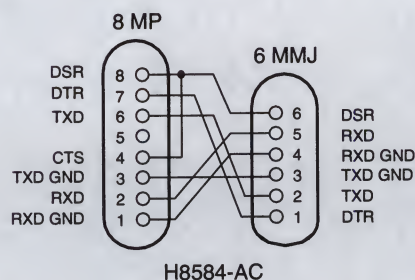
**Figure A-37. 8-Pin MP to 6-Pin MMJ Adapter (H8584-AC)**



H8585-AA

LKG-6973-97F

**Figure A-38. Male to Female 25-pin D-Sub with EOS/ESD Protection (H8585-AA)**



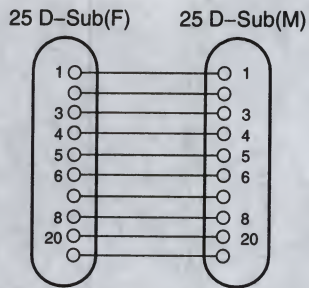
H8584-AC

LKG-6972-921

**Figure A-39. 9-Pin Female D-Sub to 6-Pin MMJ (for PC Serial Printer Port (H8571-J))**



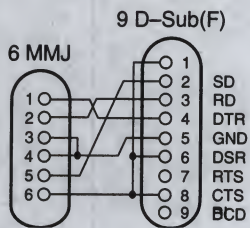
## Miscellaneous Pin-Pair Diagrams for Connectors and Equipment Cables



\*Note: EOS/ESD protection devices are

LKG-5387±911

**Figure A-40. Male to Female 25-Pin D-Sub with EOS/ESD Protection (H8853-AA)**



LKG-5342-911

**Figure A-41. 9-Pin Female D-Sub to 6-Pin MMJ (for PC Serial Printer Port (H8571-J))**







## **Appendix B. OPEN DECconnect Performance Specifications**

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Appendix B describes the OPEN DECconnect Super-5 System performance specifications.

DIGITAL developed a complete 100-ohm twisted-pair (UTP) and screened twisted-pair (ScTP) system that exceeds the component channel Category 5 specifications of TIA/EIA-568A and ISO/IEC 11801 Structured Wiring Standards.



## OPEN DECconnect Super-5 System Specification

DIGITAL developed a complete UTP / ScTP system — consisting of cables, patch cords and connectors — that complies with Category 5 performance specifications as defined in the TIA/EIA-568A and ISO 11801 standards. These standards define the highest system performance for twisted-pair cable. The components that comprise DIGITAL's Super-5 system have been independently tested by UL and/or ETL to verify compliance with Category 5 performance specifications for UTP/ScTP cables and connectors.

The following tables summarize the standard parameters that are specified for the OPEN DECconnect interconnect system. These specifications, along with the link performance specifications, are in accordance with TIA/EIA-568A and the ISO 11801 standard.

**Table B-1: Connecting Hardware Specification**

Parameter	Frequency in MHz	Limit in dB
Attenuation	1.0	0.1
	6.0	0.1
	8.0	0.1
	10.0	0.1
	16.0	0.2
	20.0	0.2
	25.0	0.2
	31.25	0.2
	62.50	0.3
	100.00	0.4
Near-end cross-talk	1.0	>65
	6.0	>65
	8.0	62
	10.0	60
	16.0	56
	20.0	54
	25.0	52
	31.25	50
	62.50	44
	100.00	40



**Cable Specifications Horizontal — 4-Pair****DC Resistance**

The resistance shall not exceed 9.38-Ohms per 100 m (328 ft).

**DC Resistance Unbalance**

The resistance unbalance between the two conductors of any pair shall not exceed 5%.

**Mutual Capacitance**

The mutual capacitance of any pair at 1 KHz and measured at or corrected to a temperature of 205 C should not exceed 6.6nF per 100 m (328 ft) for Category 3 cable, and should not exceed 5.6 nF per 100 m (328 ft) for Category 5 cable.

**Capacitance Unbalance: Pair to Ground**

The capacitance unbalance to ground at 1 KHz of any pair shall not exceed 330 pF per 100 m (328 ft).

**Characteristic Impedance and Structural Return Loss (SRL)**

The SRL shall be greater than or equal to the values given in the table below for all frequencies from 1 MHz to 100 MHz a length of 100 m (328 ft) or longer.

**Table B-2: Horizontal UTP/ScTP Cable SRL — Worst Pair**

Frequency (MHz)	Category 3 (dB)	Category 4 (dB)	Category 5 (dB)
1 - 10	12	21	23
10 - 16	12 - 10log(f/10)	21 - 10log(f/10)	23
16 - 20		21 - 10log(f/10)	23
20 - 100			23 - 10log(f/10)

**Attenuation****Table B-3: Horizontal UTP/ScTP Attenuation per 100m (328 ft at 20 C); Worst Pair**

Frequency (MHz)	Category 3 (dB)	Category 4 (dB)	Category 5 (dB)
0.064	0.9	0.8	0.8
0.256	1.3	1.1	1.1
0.512	1.8	1.5	1.5
0.772	2.2	1.9	1.8
1.0	2.6	2.2	2.0
4.0	5.6	4.3	4.1
8.0	8.5	6.2	5.8
10.0	9.7	6.9	6.5
16.0	13.1	8.9	8.2



**Table B-3: Horizontal UTP/ScTP Attenuation per 100m (328 ft at 20 C); Worst Pair**

Frequency (MHz)	Category 3 (dB)	Category 4 (dB)	Category 5 (dB)
20.0		10.0	9.3
25			10.4
31.25			11.7
62.5			17.0
100			22.0

**Near-end Crosstalk (NEXT) Loss**

NEXT (F).  $\text{NEXT} (0.772) - 15 \log (f/0.772)$

See Table B-4 for all frequencies (f) in MHz in the range from 0.772 MHz to the highest referenced frequency for a length of 100 m (328 ft) or longer.

The NEXT value at 0.772 MHz is:

- 43 dB for Category 3 cable
- 64 dB for Category 5 cable

**Table B-4: Horizontal UTP/ScTP NEXT per 100m (328 ft at 20 C): Worst Pair**

Frequency (MHz)	Category 3 (dB)	Category 4 (dB)	Category 5 (dB)
.0150	53	68	74
0.772	43	58	64
1.0	41	56	62
4.0	32	47	53
8.0	27	42	48
10.0	26	41	47
16.0	23	38	44
20.0		36	42
25.0			41
31.25			40 (ISO 11801))
62.5			35
100.0			32



Table B-5: Cable Specifications

		24 AWG		22 AWG
Attenuation (dB/100 meters at 20 C)		Solid Conductors	Stranded Conductors*	Solid Conductors
	64 kHz	0.8	—	0.8
	256	1.1	1.3	1.1
	512	1.5	1.8	1.5
	772	1.8	2.2	1.8
	1.0 MHz	2.0	2.5	2.0
	4.0	4.1	5.2	4.1
	8.0	5.8	7.1	5.8
	10.0	6.5	7.9	6.5
	16.0	8.2	9.8	8.2
	20.0	9.3	11.0	9.3
	25.0	10.4	12.6	10.4
	31.25	11.7	14.2	11.7
	62.5	17.0	20.5	17.0
	100.0	22.0	26.4	22.0
Worst pair Near End Crosstalk dB, Min. (4-pair cable)				
	150 kHz	74		
	772	64		
	1.0 MHz	62		
	4.0	53		
	8.0	48		
	10.0	47		
	16.0	44		
	20.0	42		
	25.0	41		
	31.25	40 (ISO 11801)		
	62.5	35		
	100.0	32		
*Stranded cable can only be used for patch cords.				



## **OPEN DECconnect Screened High-Performance Interconnect Components**

### ***Screen Versus Shielded***

Two types of twisted-pair cables exist that incorporate shielding. Shielded twisted-pair cable (STP) provides individual shields for each wire pair and an overall shield covering the individual pairs. Screened twisted-pair cable (ScTP) incorporates only an overall shield covering the unshielded twisted pairs included in the cable. Most 100-ohm twisted-pair cables that incorporate shielding are screened twisted-pair.

DIGITAL supplies a complete line of screened connectors and cables. DIGITAL's OPEN DECconnect screened cables and connectors meet the performance specifications defined in TIA/EIA-568A (Category 5 UTP). The ISO 11801 standard covers generic cabling for the customer premises.

ISO 11801 specifies 100-ohm shielded/screened twisted-pair cable as one cable type used on the customer premises. It also defines that cable's performance using the same parameters defined in TIA/EIA-568A with the additional specification defining transfer impedance. DIGITAL tested its screened system to ensure compliance with the performance specifications defined for Category 5, and continues to monitor the standards activities to ensure that the company's screened system continues to meet all specifications.

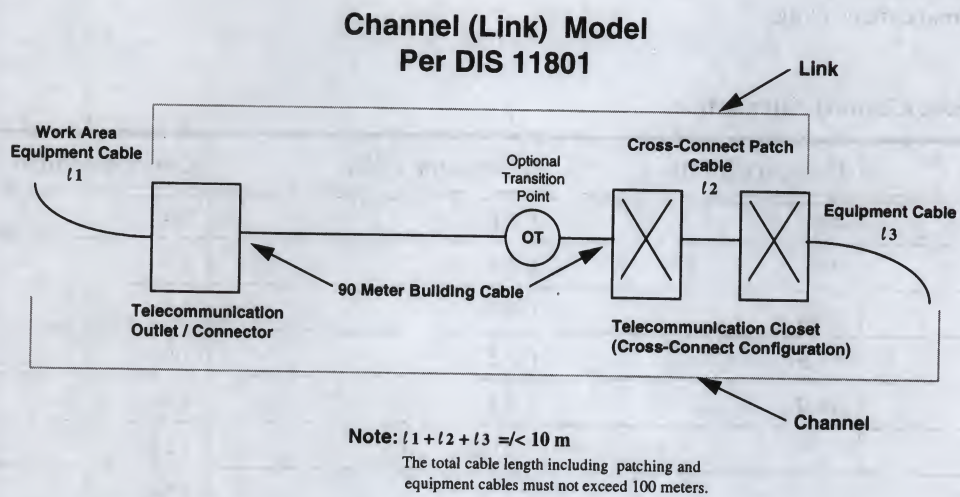
### **OPEN DECconnect UTP Link Performance Specification**

The following specification is from the TIA/EIA-568A and ISO 11801 standards, and reflects the latest link/channel definition for Category 5 performance. This specification defines the worst case assumptions for near-end crosstalk (NEXT) and attenuation of the link. The TR-41.8.1 Link Performance Task Group defined test methods and parameters to verify performance of the network link/channel.

The data in this document can be used to compare the measured link performance against the worst case assumption. This set of parameters establishes worst case values for crosstalk by assuming that all crosstalk adds in phase, return loss is not considered to be a factor. As long as equipment manufactures use the worst case model, when designing their interfaces, there will be sufficient margin to ensure that the system faithfully transmits information over the link. DIGITAL publishes specifications, test methods and practices to test and verify the link's performance. These procedures are published in a separate document.

Category 4 limits are not emphasized in this document. Category 4 provides limited benefit and it is recommended that Category 5 links be specified for high-speed data applications required to support 20 to 100 MHz bandwidth.





**Figure B-1: Channel Link Model Per ISO 11801**

The tables on the following pages define the critical parameters effecting the performance of the cable channel.



## Channel Attenuation

The Channel Attenuation values shown in Table B-6 are based on the summation of the following attenuation:

- 90 m of horizontal cable
- 10 m of patch cord cable
- Four connecting hardware
  - Cross-connect
  - Transition Point
  - Telecommunications Outlet

**Table B-6: Worst Case: Channel Attenuation**

Frequency (MHz)	Category 3 (dB)	Category 4 (dB)	Category 5 (dB)
1.0	4.2	2.6	2.4
4.0	7.5	4.8	4.5
8.0	10.2	6.7	6.3
10.0	11.5	7.5	7.0
16.0	14.9	9.9	9.2
20.0		11.0	10.3
25.0			11.4
31.25			12.8
62.5			18.5
100			24.0



**Table B-7: Worst-Case Link Near-end Crosstalk (NEXT) Measured from the Office Equipment Telecommunications Outlet/Connector**

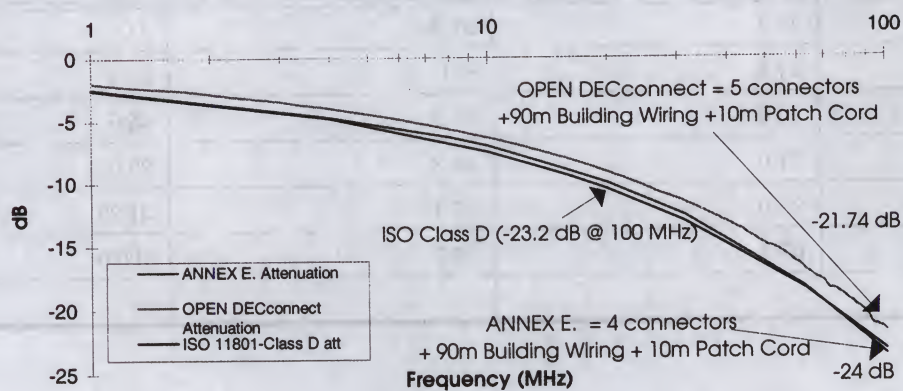
Frequency (MHz)	Category 3 (dB)	Category 4 (dB)	Category 5 (dB)
1.0	40.1	61.3	4.0
30.7	51.8	8.0	25.9
47.1	10.0	24.3	45.5
16.0	21.0	42.3	20.0
40.7	25.0	39.1	31.25
37.6	62.5	32.7	100.0
29.3			

**Table B-8: Worst-Case Link Near-end Crosstalk (NEXT) Measured from the Telecommunications Equipment Closet Outlet / Connector**

Frequency (MHz)	Category 3 (dB)	Category 5 (dB)
1.0	39.1	60.3
4.0	29.3	50.6
8.0	24.3	45.6
10.0	22.7	44.0
16.0	19.3	40.6
20.0		39.0
25.0		37.4
31.25		35.7
62.5		30.6
100.0		27.1

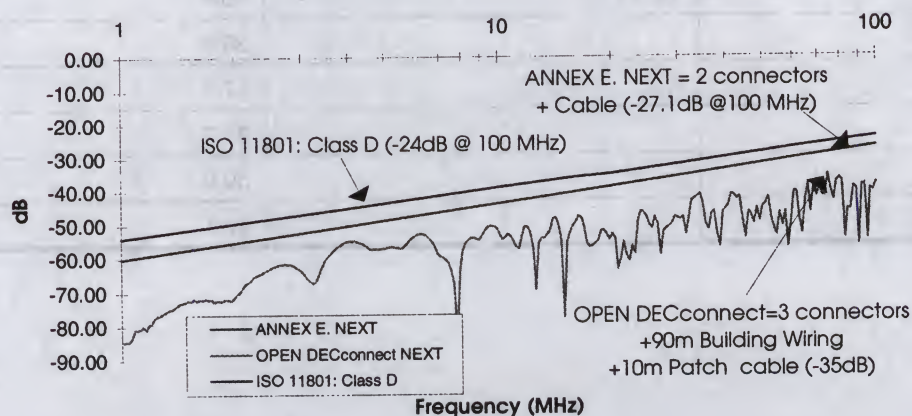


**OPEN DECconnect Channel: Attenuation Measurements  
Compared to TIA/EIA-568A and ISO 11801 Specifications**



**Figure B-2: Attenuation Measurements**

**OPEN DECconnect Channel: NEXT Measurements Compared  
to TIA/EIA-568A and ISO 11801 Specifications**



**Figure B-3: NEXT Measurements**



## **15-Year Application Assurance Warranty**

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Super-5 cabling is warranted for horizontal and backbone cabling designs as specified and tested in accordance with the *OPEN DECconnect Super-5 Design and Installation Guidelines*.

### ***OPEN DECconnect 15-Year Application Assurance Warranty***

Digital Equipment Corporation warrants that, for a period of fifteen (15) years following customer acceptance, DIGITAL's OPEN DECconnect passive wiring components will transport data in accordance with the cable channel specification in effect at the time of acceptance. DIGITAL, at its option, will repair or replace any defective cable channel component, which causes the channel to fail to meet the original design specification within the warranty period.

This warranty is effective only if the cable channel is designed and installed by DIGITAL's authorized reseller, in accordance with DIGITAL's approved design specifications, and is operating at the customer's original location. This warranty only covers the passive network components approved and specified by DIGITAL, and is intended for use with active network interface products certified by the manufacturer to comply with the cable channel specification released by the major standards organizations in effect at the time of installation. Future upgrades, changes, applications and/or requirements to the network are covered by authorized resellers, and is tested and verified in accordance with the latest version of DIGITAL's cable channel specification.

Except as specifically provided herein, DIGITAL disclaims all other Warranties, either expressed or implied, including but not limited to the implied Warranties of merchantability and fitness for a particular purpose. This Warranty does not extend or modify product Warranties relating to specific network components.







## Appendix C. Application/Configuration Rules

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Appendix C defines the basic and extended application/configuration rules defined by ANSI/IEEE Standard 802.3.



## **802.3/Ethernet and Network Configuration Rules**

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The following sections briefly describe the basic and extended 802.3 standard configuration rules. Outlines of both 802.3 Model 1 and Model 2 are included.

**Note:** For a more detailed explanation of the requirements of Model 1 and Model 2, refer to the IEEE 802.3 Transmission Standard Documentation.

### **IEEE 802.3 Transmission Model 1**

The 802.3 Transmission Model 1 configuration rules are meant to be simple and straightforward; therefore, they are necessarily restrictive to accommodate a wide variety of vendor equipment with a large margin of timing delay within the network structure.

### **IEEE 802.3 Transmission Model 2**

Transmission Model 2 covers a broad set of topologies that do not fit within the restrictive rules of Model 1. This model allows configurations that exceed those rules and are derived from a series of calculations based upon the worst-case delay paths in the network design. Network configurations are defined by a set of calculations which are qualified against two requirements:

- Maximum collision fragment size
- Interpacket gap shrinkage

**Note:** For a detailed explanation and sample calculations, refer to the draft supplement the of ANSI/IEEE 802.3 standard.



## EIA-423 Configuration Rules

The EIA-423 signaling system is used for low-speed connections (up to 38.4 Kb/s) for terminals and printers; it operates over unshielded and screened twisted-pair.

DIGITAL's implementation of the EIA-423 standard is fully compatible with EIA-232 and EIA-422 signaling systems. The H8575 and H8585 passive adapters provide the connection from an EIA-232 25-pin connector to the EIA-423 6-pin modified modular jack (MMJ) or 8-pin modular jack (MJ).

Table C-1 indicates the maximum supported distances at data rates up to 38.4 Kb/s for both homogeneous and mixed EIA-232, EIA-423, and EIA-422 systems. Although distances greater than 100 meters (328 feet) are possible in some cases, exceeding 100 meters may not allow migration to other signaling protocols, for example, 10BaseT.

**Note:** For more information, refer to the appropriate TIA/EIA 568A standards documentation.

**Table C-1: Maximum Distances Supported on UTP and ScTP**

Standard	EIA-232	EIA-423	EIA-422
EIA-232	76.2 m (250 ft)	76.2 m (250 ft)	N/A
EIA-423	76.2 m (250 ft)	304.8 m (1,000 ft)	304.8 m (1,000 ft)
EIA-422	N/A	304.8 m (1,000 ft)	914.4 m (3,000 ft)



## 802.5/Token Ring Configuration Guidelines

### Cabling

Table C-2 lists the Token Ring industry guideline for the maximum lobe length of screened twisted-pair (ScTP) and unshielded twisted-pair (UTP) cable.

**Table C-2: Industry Lobe Length Guideline**

Speed	UTP		ScTP
	Category 3	Category 5	
4 Mb/s	100 m (328 ft)	100 m (328 ft)	100 m (328 ft)
16 Mb/s	65 m (213 ft)	100 m (328 ft)	100 m (328 ft)

Lobe lengths for DIGITAL's MAUs exceed the industry guideline. Specifically, lobe lengths can be longer than the industry guideline for ScTP cable and UTP Category 5 cable at 4 Mb/s. See Table C-3 for the maximum lobe lengths for DIGITAL's MAUs. Also refer to either DIGITAL MultiSwitch 900 configuration or DEChub ONE configurations sections below for more configuration information.

**Table C-3: DIGITAL Lobe Length Guideline**

Speed	UTP		ScTP
	Category 3	Category 5	
4 Mb/s	100 m (328 ft)	200 m (655 ft)	376 m (1235 ft)
16 Mb/s	65 m (213 ft)	100 m (328 ft)	173 m (569 ft)
<sup>1</sup> All distances include patch cables and hub connections.			

DIGITAL recommends keeping maximum lobe lengths within industry guidelines whenever possible. This allows for future network expansion and upgrade. When current needs dictate the longer lobe lengths, lobe lengths can be increased up to the maximums in DIGITAL's guideline without any negative effect on the network.

### Multiple Hubs

A repeater is needed in each hub to connect hubs in a multiple hub network. Refer to the appropriate Token Ring repeater manual for specific information.



## 802.5/Token Ring Configuration Guidelines

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### Unshielded Twisted-Pair Cable Configuration

#### *Multiple MAUs in One Wiring Closet at 16 Mb/s*

At 16 Mb/s, a maximum of five MAUs can be in one wiring closet without affecting maximum lobe length. Subtract 10 meters (33 feet) from the lobe lengths in Table C-3 for each MAU above five in a wiring closet.

#### *Multiple Wiring Closets*

DIGITAL recommends using repeaters to segment the ring in a network with multiple wiring closets. In some situations, either one or no repeaters are required. Refer to the appropriate Token Ring repeater manual for specific information.

Two repeaters are required when distances exceed the lobe lengths in Table C-3 or if the MAU does not have DIGITAL's Autowrap functionality.

When a MAU has Autowrap enabled, only one repeater is required per wiring closet if the distance between the wiring closets does not exceed the distances shown in Table C-3.

With UTP Category 5 cable at 4 Mb/s, repeaters are not required with multiple wiring closets if the total cable budget is within the distances shown in Table C-4.

For UTP Category 3 cable at 4 Mb/s, divide all distances in Table C-4 by 1.3.



## 802.5/Token Ring Configuration Guidelines

**Table C-4: Total Cable Budget for UTP Category 5 Cable at 4 Mb/s**

MAUs	Wiring Closets						
	0	1	2	3	4	5	6
1	210 m <sup>1</sup> (689 ft)	206 m (675 ft)					
2	192 m (630 ft)	189 m (620 ft)	185 m (607 ft)				
3	175 m (574 ft)	171 m (561 ft)	168 m (551 ft)	164 m (538 ft)			
4	157 m (515 ft)	154 m (505 ft)	150 m (492 ft)	147 m (482 ft)	143 m (469 ft)		
5	140 m (459 ft)	136 m (446 ft)	133 m (436 ft)	129 m (423 ft)	126 m (413 ft)	122 m (400 ft)	
6	122 m (400 ft)	119 m (377 ft)	115 m (377 ft)	112 m (367 ft)	108 m (354 ft)	105 m (344 ft)	101 m (331 ft)
<sup>1</sup> All distances include patch cables.							
Note: Total cable budget = Maximum lobe length + adjusted ring length. Adjusted ring length = Total trunk length - shortest trunk length.							

### Shielded Twisted-Pair Configuration

DIGITAL supports industry standards for shielded twisted-pair (STP) cable. Refer to the *IBM Token Ring Network Introduction and Planning Guide* for specific information on STP cable.

### Cable Connector Specifications

Table C-5 lists the signal names of each pin associated with the Ring In, Ring Out, and lobe connectors.

**Table C-5: MAU Connector Signal Names**

Connector Name	Pins							
	1	2	3	4	5	6	7	8
Ring In	RS-422 RX+	RS-422 RX+	Transmit-	Receive+	Receive-	Transmit+	RS-422 TX-	RS-422 TX+
Ring Out	Not used	Not used	Receive-	Transmit+	Transmit-	Receive+	Not used	Not used
Lobe	Not used	Not used	Receive-	Transmit+	Transmit-	Receive+	Not used	Not used



## FDDI Configuration Rules

### Network Constraints

DIGITAL recommends a maximum of 100 connections in one network. Seven bridges is the maximum number allowed between two nodes on an extended LAN.

### Connection Rules

Connection rules are specified to discourage the construction of illegal topologies. The ring connection rules for DIGITAL devices are listed in Table C-6. In the FDDI topology, the following four port types exist:

- **Port A** — Connects to the incoming primary ring and the outgoing secondary ring of the FDDI dual ring. This port is used for dual attachment connections (source port)
- **Port B** — Connects to the outgoing primary ring and the incoming secondary ring of the FDDI dual ring. This port is used for dual attachment connections (sink port)
- **Port M** — Single attachment port on wiring concentrator (source port)
- **Port S** — Single attachment port on a single attachment station (sink port)

Table C-6: Supported Connections for Port Designations

	A	B	M	S
A	—	Yes	—	Yes
B	Yes	—	Yes	—
M	—	Yes	—	Yes
S	Yes	—	Yes	—

The FDDI standards specify:

- Fiber-optic cable type
  - 62.5/125-micron multimode fiber
  - 8.10/125-micron single-mode fiber
- Ring distance as a maximum fiber length of 200 kilometers (124 miles)
- Link distance between stations for
  - Multimode fiber with a maximum length of 2 kilometers (1.2 miles)
  - Single-mode fiber in excess of 20 kilometers (12.4 miles)
- A maximum of 500 stations per FDDI LAN







## Appendix D. Discontinued OPEN DECconnect Products

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Appendix D lists active and passive products that are discontinued or on maintenance-only lists. Each table lists the product's order number, description, and replacement.



**Discontinued Passive OPEN DECconnect Products**

Table D-1 lists the passive OPEN DECconnect products (by product number) that are discontinued, and describes the discontinued product and replacement part.

**Table D-1: Discontinued Passive OPEN DECconnect Products**

Order Number	Description	Replaced By	Order Number	Description	Replaced By
BC16D-50	DHV concentrator	N/A	H3107-N	MJ-MJ P/P insert	H3117-NC
BC16K-06	BNC-BNC cable	N/A	H3107-P	BNC P/P insert	H3117-PA
BCC04-25	Modem cable	N/A	H3107-R	Shld 110-MJ P/P	H3117-LB
BCC08-50	Term ODT cable	N/A	H3107-S	ST-ST P/P insert	H3117-SA
BN26K-03	8-pin to pin MP	BN25G-03	H3108-BA	Metal P/P hinged	H3108-BB
BN26K-04	8-pin to pin MP	BN25G-04	H3108-CA	Blank P/P insert (10)	H3108-HA
BN26K-07	8-pin to pin MP	BN25G-07	H3108-DA	Metal P/P flush	H3108-BB
BN26K-0E	8-pin to pin MP	BN25G-0E	H3108-FA	Strain relief bar	N/A
BN26L-03	8-pin to pin MP	BN26M-03	H3108-GA	Adapter plate SER	N/A
BN26L-04	8-pin to pin MP	BN26M-04	H3108-JA	Partition Bracket	DERMS-CA
BN26L-07	8-pin to pin MP	BN26M-07	H3114-FC	ST Connector	H3114-FK
DEHUX-CA	Wlmnt Plt/cover (2)	DERMS-FA	H3114-FH	Coupler Panel	H3114-GA
DEHUX-DA	Wallmnt plate (1)	DERMS-AA	H3114-FA	Fiber Connector	H3114-FL
DEHUX-GA	Lock	DERMS-EA	H3114-FG	Splice	H3114-FS
H3105-A	Active adapter	N/A	H3118-FA	ST Pigtail	H3118-FB
H3105-B	Act adapter Europe	N/A	H3117-NA	MJ-MJ P/P insert	H3117-NC
H3107-L	110-MJ P/P insert	H3117-LA	H3117-UA	Adptr brk metal	H3108-UB
H3107-M	50-Pin-MJ P/P insert	H3117-MA	H3131-C	Remote wall enclosure	H3131-CA
H3107-G H3107-H	Splice Shelf Storage Shelf	H3107-GC	H8853-AA	25-pin M/F	N/A
			H9646-EA	Equipment cabinet	N/A
H3107-J	Fiber Shelf	H3107-JA	BN24F	10BaseT cable	BN24Q
H3107-K	Fiber Termination Shelf	H3107-JA	BN26N	10BaseT cable	BN28Q



**Discontinued Active Products**

Table D-3 lists the active OPEN DECconnect hub products that are discontinued.

**Table D-2: Discontinued Active Hub Products**

Order Number	Description
DSRVD-MA	DECserver 90L
DETMR-AA	DECrepeater 90T

Table D-3 lists the active OPEN DECconnect products (by order number) that are discontinued, and provides a brief description of the discontinued product.

**Table D-3: Other Discontinued Active Products**

Order Number	Description
DE210-AA	DEC EtherWORKS MC, MC/TP 802.3/Ethernet PC Network Interface Card
DETPR-AB	DECrepeater 350, 8-port unshielded twisted-pair to 802.3/10BaseT repeater, 240 V
DE212-AA	DEC EtherWORKS MC, MC/TP 802.3/Ethernet PC Network Interface Card
DETPR-BA	DETPR-AA without plastic cover, 120 V
DE422-SA	DEC EtherWORKS EISA, TP/BNC 802.3/Ethernet PC Network Interface Card
DETPR-BB	DETPR-BB without plastic cover, 240 V
DETPR-AA	DECrepeater 350, 8-port unshielded twisted-pair to 802.3/10BaseT repeater, 120 V







## Appendix E. Reference Documents

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Appendix E provides a selected list of references to help plan, configure, and install networks.



## Documentation Offered by Digital Equipment Corporation

DIGITAL offers documentation that covers all aspects of OPEN DECconnect products and related applications to enhance your network, and to simplify its planning, configuration, and installation. The following list provides the appropriate titles and order numbers.

Title	Order Number
<i>DECconnect System Fiber Optic Installation Guide</i>	EK-DECSY-FI/CDB
<i>DECconnect System Fiber Optic Planning and Configuration Guide</i>	EK-DECSY-FP/CDB
<i>DECconnect System H3111-C Modular Faceplate Installation Instructions</i>	EK-DECSY-MI/CDB
<i>DECconnect System H3114-AA ThinWire Daisy-Chain Faceplate Connector Installation Instructions</i>	EK-DECSY-DC/CDB
<i>DECconnect System Fiber Optic Workbook</i>	EK-DECSY-EG/CDB
<i>DECconnect System Stand-Alone ThinWire Networks: Planning and Installation Guide</i>	EK-DECSY-TG/CDB
<i>DECconnect System H3111-GA/GB/GC Modular Wallbox Installation Instructions</i>	EK-DECSY-WI/CDB
<i>Network Wiring and Applications Guide</i>	EB-K2411-42/CDB
<i>OPEN DECconnect System Guide</i>	EC-H0631-42/CDB
<i>802.5/Token Ring Configuration Catalog</i>	EC-I1382-69/CDB
<i>A Primer on FDDI: Fiber Distributed Data Interface V2.0</i>	EC-H1580-42/CDB
<i>DEChub 90 Ethernet Backplane Owner's Manual</i>	EK-DEHUB-OM/CDB
<i>DECrepeater 90FA Owner's Manual</i>	EK-DEFAR-OM/CDB
<i>DECrepeater 90FL Owner's Manual</i>	EK-DEFMR-OM/CDB
<i>DEFLM-AA Installation Guide</i>	EK-DEFLM-IC/CDB
<i>DECXM-AA Installation Guide</i>	EK-DECXM-AA/CDB
<i>DETPM-AA Installation Guide</i>	EK-DETPM-AA/CDB
<i>DECserver 90TL Owner's Manual</i>	EK-DSRVE-OM/CDB
<i>DECserver 90L+ Owner's Manual</i>	EK-DSRVG-OM/CDB
<i>DEC WANrouter 90 Owner's Manual</i>	EK-DRT90-OM/CDB
<i>DECbridge 90 Owner's Manual</i>	EK-DEWGB-OM/CDB
<i>DECbridge 90FL Owner's Manual</i>	EK-DEWGF-OM/CDB
<i>DECagent 90 User Information</i>	EK-DENMA-UI/CDB
<i>DEChub ONE Installation Guide</i>	EK-DEHUA-IN/CDB
<i>DECrepeater 900TM Installation Guide</i>	EK-DETM-M-IN/CDB
<i>DECserver 900TM Installation Guide</i>	EK-DSRVZ-IN/CDB
<i>DECbrouter 90T Installation Guide</i>	EK-DECBR-OM/CDB
<i>DECmau 900TL Installation Guide</i>	EK-DTMAU-IN/CDB
<i>DECrepeater 900TL Installation Guide</i>	EK-DTROR-IN/CDB



Title	Order Number
<i>DECrepeater 900SL Installation Guide</i>	EK-DTROS-IN/CDB
<i>DEChub 900 MultiSwitch Hub Manager Installation Guide (DIGITAL MultiSwitch 900)</i>	EK-HUBMA-IN/CDB
<i>DEChub 900 MultiSwitch Owner's Manual (DIGITAL MultiSwitch 900)</i>	EK-DH2MS-OM/CDB

### Documentation from Other Sources

The following lists important safety and standards documents. These documents can be ordered directly from the resources provided.

Title	Order From:
<i>TIA/EIA 568A Commercial Building Wiring Standard</i>	<p>The Electronics Industries Association (EIA) 2500 Wilson Boulevard Arlington, VA 22201</p> <p>Telephone: (703) 907-7500</p> <p>or</p> <p>Telecommunications Industries Association (TIA) 2500 Wilson Boulevard Arlington, VA 22201</p> <p>Telephone: (703) 907-7700</p>
<i>National Electrical Code (NEC) 1996 Version part number: 70-96SB</i>	<p>The National Fire Protection Association (NFPA) 1 Batterymarch Park Quincy, MA 02269</p> <p>Telephone: (800) 344-3555</p>







## Glossary

Term	Definition
19-inch RETMA rack	A 19-inch distribution frame rack for mounting active and passive components.
2.5-mm bayonet ST type	A 2.5-mm ferrule straight-tip fiber connector. The connector is spring-loaded and keyed to enable quick mating and re-mating of cable.
802.3/10Base2 network	A network conforming to the IEEE 802.3 local area network standard. The network can carry information at rates up to 10 Mb/s over cable segments of 185 m (610 ft).
802.3/10BaseT	10 Mb/s 802.3/Ethernet over standard unshielded twisted-pair cable.
802.3/Ethernet	Ethernet standard (ISO 802.3). A local area network protocol that uses a carrier-sense multiple access with collision detection (CSMA/CD) scheme to arbitrate the use of a 10 Mb/s baseband coaxial cable.
American National Standards (ANSI)	An organization that coordinates, develops, and publishes standards for use in the United States.
American Wire Gauge (AWG)	A standard for determining wire size. The gauge varies inversely with the actual wire diameter.
ANSI	See American National Standards Institute.
ANSI FDDI PMD	ANSI (American National Standards Institute) Fiber Distributed Data Interface Physical Layer Medium Dependent.
AWG	See American Wire Gauge.
backbone	The part of the network that carries the heaviest traffic. It is the main trunk cable from which all connections to the network are made.
barrel connector	A female connector that joins two sections of standard Ethernet cable or two sections of ThinWire Ethernet coaxial cable.
bend radius	The minimum radius to which a cable can be bent without damaging the cable.
BNC	A connector used to terminate coaxial cable such as ThinWire.
carrier-sense multiple access with collision detection (CSMA/CD)	The channel access method used by Ethernet and ISO 8802-3 local area networks.
closet	The point on each floor of a building where workstations connect to the trunk cable or local area network.
coaxial cable	Two-conductor, concentric, constant impedance transmission cable. Two examples are standard Ethernet cable and ThinWire Ethernet cable.
cross-connect cable	Equipment cable and passive hardware used to administer the connection of cables at a distribution frame.
crossover cable	Equipment cable(s) within a link that connect in such a way as to route the transmit port of one piece of active equipment to the receive port of another piece of active equipment.
daisy-chain	Serial connection of devices with or without a faceplate.



Term	Definition
DB25 connector	A 25-pin connector that meets the physical requirements of the EIA 232-D interface.
EIA	See Electronic Industries Association.
EIA 423-A interface	A signaling interface that runs on twisted-pair data cables to support terminal-to-host communications.
TIA/EIA-568	A standard that defines telecommunications wiring requirements for a building or multiple buildings in a campus environment.
Electronic Industries Association (EIA)	A standards organization specializing in the electrical and functional characteristics of interface equipment. See also Telecommunications Industries Association.
environmental airspace	Airspace below a floor or above a hung ceiling used as a return duct for heating, air conditioning, or both.
faceplate	A wall receptacle that provides the single network connection point for office communication equipment.
FDDI	See Fiber Distributed Data Interface.
Fiber Distributed Data Interface (FDDI)	A set of ANSI/ISO standards that define a high-bandwidth (100 Mb/s) general purpose LAN connection between computers and peripheral equipment in a timed-token passing, dual ring of trees configuration.
fiber optics	The technique of using fiber-optic transmitters, receivers, and cables for the transmission of data.
fiber-optic cable	A transmission medium designed to transmit digital signals in the form of pulses and light.
HC	See Horizontal Cross-Connect.
HDF	See Horizontal Cross-Connect.
horizontal cross-connect (HC)	Located in an equipment room on the floor of a building. Consists of the active, passive, and support components that provide the connection between the building backbone cabling and the horizontal wiring.
horizontal wiring	That part of the wiring that extends from and includes the telecommunications outlet in the work area to the telecommunications closet.
IC	See Intermediate Cross-Connect.
IDF	See Intermediate Cross-Connect.
interconnect cable	Equipment cable used for interconnection of active equipment to a panel.
intermediate cross-connect (IC)	Located in an equipment room. Consists of the active, passive, and support components that provide the connection between interbuilding and intrabuilding cabling for a campus and the intrabuilding cabling for a building.
International Organization for Standardization (ISO)	An international agency that develops international standards for information exchange. ISO is based in Geneva, Switzerland.
local area network (LAN)	A data communications network that provides high-speed communication in a moderate-size geographical area.



Term	Definition
MC	See Main Cross-Connect.
main cross-connect (MC)	Located in an equipment room. Consists of active, passive, and support components that provide the connection of the interbuilding backbone cables between intermediate distribution frames.
MDF	See Main Cross-Connect.
MJ	See Modular Jack.
MMJ	See Modified Modular Jack.
MMP	See Modified Modular Plug.
modified modular jack (MMJ)	A jack used for connecting EIA 423 data cables to a faceplate.
modified modular plug (MMP)	A device attached to the end of a connectorized feeder cable that converts the 25 pairs to individual 2-, 4-, 6-, and 8-wire channels.
modular jack (MJ)	An EIA standard jack used for connecting voice cables to a faceplate.
network	Collection of systems interconnected by lines.
octopus cable	A device attached to the end of a connectorized feeder cable that converts the 25 pair to individual 2-, 4-, 6-, and 8-wire channels.
office distribution frame (ODF)	An enclosed rack usually located in an office area. Consists of the active, passive, and support components that provide the physical connection between the horizontal wiring and the wallbox.
Open Systems Interconnection (OSI)	Set of international standards developed by ISO. The goal of OSI is that different vendors' computer systems can interconnect.
Physical Layer Medium Dependent	FDDI standard that defines symbols, line states, clocking requirements, and the encoding of data for transmission.
plenum (UL CMP)	An air handling space inside a building, plenum-rated cable is UL-certified for installation without conduits in environmental airspaces.
PVC (UL CMR)	Polyvinyl Chloride. The standard coating used on cables. PVC is UL-certified for installation in office areas.
remote wall distribution frame (RWDF)	A small wall-mounted cabinet that consists of the passive and support components that provide the physical connection between the horizontal wiring and the wallbox.
ring	Connection of two or more stations in a circular logical topology. Information is passed sequentially between active stations, each one in turn examining or copying the data, and finally returning it to the originating station, which removes it from the network. See also Token.
RWDF	See Remote Wall Distribution Frame.
satellite distribution frame (SDF)	Located in an equipment room on the floor of a building. Consists of the active, passive, and support components that provide the connections between the horizontal wiring and the wallbox.
ScTP	100-ohm screened twisted-pair.



Term	Definition
shielded twisted-pair	Multiple-conductor cable with component cables that are paired together, twisted, and enclosed within a single jacket.
splice shelf	Shelf used to store fiber mechanical or fusion splices. Contains up to three splice organizers, each tray storing up to two splices.
STP	See Shielded twisted-pair.
Telecommunications Industries Association (TIA)	TIA was formed from the Electronics Industries Association and the United States Telecommunications Buyers Association. The TIA fiber-optic committees develop and publish testing standards and specifications for fiber-optic components and systems. See also Electronic Industries Association.
termination shelf	A shelf used to terminate indoor or outdoor fiber cable.
terminator	A special connector, used on both ends of a standard Ethernet or ThinWire Ethernet segment, which provides the 50-ohm termination resistance needed for the cable.
ThinWire Ethernet cable	A flexible, inexpensive cable supporting Ethernet communications and consisting of a 50-ohm solid center conductor, foam dielectric, foil shield, braid, and outer covering (either PVC or plenum-rated).
TIA	See Telecommunications Industries Association.
token	A bit pattern consisting of a unique symbol sequence that circulates around the ring following a data transmission. The token grants stations the right to transmit. See also ring.
transceiver cable	A cable used to attach a device either to a standard Ethernet segment or to a DESTA connected to a ThinWire Ethernet segment.
TP-PMD	Twisted-Pair Physical Media Device.
unshielded twisted-pair (UTP)	Twisted-pair cable without metal shielding around the conductors, typically 4-pairs, 24 gauge.
wallbox	An outlet that connects work area wiring to the horizontal wiring. Also called faceplate, communications outlet, information outlet, or telecommunications outlet.



## Numerics

- 110 IDC components, See Distribution frame components, 110 IDC terminal blocks and components
- 110 IDC terminal blocks and components
  - 100 pair (no legs) TIA/EIA Category 5, 3-17
  - 100 pair with, 4-pair connector kit
    - TIA/EIA Category 5, 3-17
  - 100 pair with mounting legs
    - TIA/EIA Category 5, 3-17
  - 110 pair with mounting legs
    - TIA/EIA Category 5, 3-17
  - 300 pair with, 4-pair connector kit
    - TIA/EIA Category 5, 3-17
  - 300 pair with mounting legs
    - TIA/EIA Category 5, 3-17
  - 50 pair (no legs) TIA/EIA Category 5, 3-17
  - 50 pair with, 4-pair connector kit
    - TIA/EIA Category 5, 3-17
  - 50 pair with mounting legs
    - TIA/EIA Category 5, 3-17
  - connector block, 3 pair, 3-17
  - connector block, 4 pair, 3-17
  - connector block, 5 pair, 3-17
  - labels and label holder, 3-17
  - prewired 50-Pin CHAMP to 50-Pair
    - 110 IDC Category 3, 3-17
- 12-19816-01, 3-33
- 12-19817-01, 3-33
- 12-21766-01, 3-33
- 29-24662, 3-47
- 29-24667, 3-47
- 29-24668, 3-47
- 802.3 Network Interface Cards
  - EtherWORKS 3 Turbo 802.3/Ethernet
    - 10Base2 card, 4-36
  - EtherWORKS 3 Turbo 802.3/Ethernet
    - 10BaseT card, 4-36

- EtherWORKS 3 Turbo TP 802.3/Ethernet
  - 10BaseT card, 4-36
- EtherWORKS Turbo EISA NIC
  - (AUI, BNC, TP), 4-37
- EtherWORKS Turbo PCI 10
  - Network Interface card, 4-37
- Fast EtherWORKS PCI/10/100
  - Adapter, 4-37
- 802.3/Ethernet Configuration Rules
  - IEEE 802.3 transmission model 1, C-2
  - IEEE 802.3 transmission model 2, C-2
- 802.3/Ethernet Configurations
  - 10Base2 LAN Repeaters,
    - DECrepeater 90C, 4-30
  - bridges, routers, and routers
  - DECbridge 90FL, 4-22
  - DECbrouter 90, 4-48
  - DECwanrouter 90, 4-50
  - copper and point-to-point fiber, 4-20
  - 10BaseF, overview, 4-25
  - 10BaseT, 4-27
- 802.3/Ethernet Products, Network
  - Interface Cards
    - EtherWORKS 3 Turbo 802.3/Ethernet
      - 10BaseT card, 4-36
    - EtherWORKS 3 Turbo EISA NIC
      - (AUI, BNC, TP), 4-37
    - EtherWORKS 3 Turbo TP 802.3/Ethernet
      - 10BaseT card, 4-36
    - EtherWORKS Turbo PCI 10 Network
      - Interface Card, 4-37
    - Fast EtherWORKS PCI 10/100
      - Adapter, 4-37
- 802.5/Token Ring Applications/Configurations
  - cable plant component requirements, 4-42
  - configuration requirements, 4-43
  - horizontal cabling design, 4-44
  - overview, 4-40



## A

Angled RETMA Mounting Bracket  
(H3108-RB), 3-36

Application/Configuration Rules, C-1

## B

BC12F, 3-14

BC12F-06, 3-14

BC12G, 3-14

BC12G-06, 3-14

BC12H, 3-14

BC12H-06, 3-14

BC12J, 3-14

BC12J-06, 3-14

BC12K, 3-14

BC12K-06, 3-14

BC12L, 3-14

BC12L-06, 3-14

BC16D-50, D-2

BC16E, 3-12

BC16E-02, 3-12

BC16E-10, 3-12

BC16E-25, 3-12

BC16E-50, 3-12

BC16E-A0, 3-12

BC16K, 3-32

BC16K-02, 3-32

BC16K-06, D-2

BC16K-10, 3-32

BC16M, 3-32

BC16M-06, 3-32

BC16M-15, 3-32

BC16M-30, 3-32

BC16U, 3-12

BC16U-10, 3-12

BC19B-02, 3-14

BC19C-02, 3-14

BC19E-02, 3-14

BC19F-02, 3-14

BC29P, 3-14

BC29P-03, 3-14

BC29Q, 3-14

BC29Q-03, 3-14

BCC04-25, D-2

BCC08-50, D-2

BN24A, 3-32

BN24A-2E, 3-32

BN24A-3E, 3-32

BN24B, 3-23

BN24B-01, 3-23

BN24B-03, 3-23

BN24B-10, 3-23

BN24B-20, 3-23

BN24B-30, 3-23

BN24B-4E, 3-23

BN24D, 3-23

BN24D-0, 3-23

BN24D-03, 3-23

BN24D-10, 3-23

BN24D-20, 3-23

BN24D-30, 3-23

BN24D-4E, 3-23

BN24E, 3-23

BN24E-01, 3-23

BN24E-03, 3-23

BN24E-10, 3-23

BN24E-20, 3-23

BN24E-30, 3-23

BN24E-4E, 3-23

BN24F, D-2

BN24H, 3-12

BN24H-03, 3-12

BN24H-04, 3-12

BN24H-07, 3-12

BN24J, 3-12, 3-15

BN24J-01, 3-12, 3-15

BN24J-03, 3-12, 3-15

BN24J-07, 3-12, 3-15



BN24K, 3-14	BN26M-01, 3-21
pinout, A-5	BN26M-03, 3-21, D-2
BN24K-03, 3-14	BN26M-04, D-2
BN24L, 3-14	BN26M-07, D-2
BN24L-03, 3-14	BN26M-0E, 3-21
BN24N, 3-13	BN26R, 3-13
pinout, A-7	pinout, A-2, A-3
BN24N-03, 3-13	BN26R-03, 3-13
BN24Q, 3-11, D-2	BN26S, 3-21
BN24Q-01, 3-11	BN26S-03, 3-21
BN24Q-03, 3-11	BN26T, 3-15
BN24Q-04, 3-11	BN26T-03, 3-15
BN24Q-07, 3-11	BN26U, 3-13
BN24Q-0E, 3-11	BN26U-03, 3-13
BN24R, D-2	BN28Q, 3-21, D-2
BN25G, 3-11, 4-44, 4-58	BN28Q-01, 3-21
BN25G-01, 3-11	BN28Q-03, 3-21
BN25G-03, 3-11, D-2	BN28Q-07, 3-21
BN25G-04, 3-11, D-2	BN28Q-0E, 3-21
BN25G-07, 3-11, D-2	BN34A, 3-24
BN25G-0E, 3-11, D-2	BN34A-01, 3-24
BN25H, 3-11	BN34A-03, 3-24
BN25H-03, 3-11	BN34A-10, 3-24
BN25U, 3-12	BN34A-20, 3-24
BN25U-01, 3-12	BN34A-2E, 3-24
BN25U-02, 3-12	BN34A-30, 3-24
BN25U-03, 3-12	BN34A-4E, 3-24
BN25V, 3-12	BN34B, 3-24
BN25V-01, 3-12	BN34B-01, 3-24
BN25V-02, 3-12	BN34B-03, 3-24
BN25V-03, 3-12	BN34B-10, 3-24
BN26K-03, D-2	BN34B-20, 3-24
BN26K-04, D-2	BN34B-2E, 3-24
BN26K-07, D-2	BN34B-30, 3-24
BN26K-0E, D-2	BN34B-4E, 3-24
BN26L-03, D-2	BN34C, 3-24
BN26L-04, D-2	BN34C-01, 3-24
BN26L-07, D-2	BN34C-03, 3-24
BN26M, 3-21	BN34C-10, 3-24



- BN34C-20, 3-24
- BN34C-2E, 3-24
- BN34C-30, 3-24
- BN34C-4E, 3-24
- BN34D, 3-24
- BN34D-01, 3-24
- BN34D-03, 3-24
- BN34D-10, 3-24
- BNE2A-MA, 3-32
- BNE2A-MB, 3-32
- BNE2A-MC, 3-32
- BNE2A-ME, 3-32
- BNE2B-MA, 3-32
- BNE2B-MB, 3-32
- BNE2B-MC, 3-32
- BNE2B-ME, 3-32
- BNE4C, 3-13
- BNE4C-01, 3-13
- BNE4C-02, 3-13
- BNE4C-05, 3-13
- BNE4D-02, 3-13
- BNE4D-05, 3-13
- BNE4G, 3-13
- BNE4G-02, 3-13
- BNE4G-05, 3-13
- Bridges, applications/configurations, 4-21
- Brouters, applications/configurations, 4-47

## C

### Cable Media

- application versus media type, 2-10

### Cable media

- 802.3/Ethernet, 2-12
- baseband, 2-9, 2-12
- fiber optic, benefits, 2-12
- LAN backbones, 2-12
- selection criteria, 2-9
- twisted pair, 2-9
- twisted-pair applications, 2-10

### Cable Organizer Kit

- Flush-Mounted (H3108-EA), 3-38

- Recess-Mounted (H3108-AA), 3-38

### Cable plant component requirements,

- 802.5/Token Ring
- application/configuration, 4-42
- connection of MAUs, 4-42

### Cable technology, recent trends, 2-9

### Cables — building wiring

- UTP high-performance data grade  
(TIA/EIA Category 5)  
(H8245-C/H8246-C), 3-16, 3-21
- UTP standard data grade  
(TIA/EIA Category 5)  
(H8245-A/H8246-A), 3-16

### Cables — device specific

- 36-pin to eight 8-pin equipment  
(BN24N), 3-13
- 36-pin to eight 8-pin MPs equipment  
(BN24N), 3-13
- 50-pin to 12 8-pin MJs (BN26U), 3-13
- 50-pin to 15-pin, D-sub (BC12F), 3-14
- 50-pin to 15-pin, D-sub (BC19C-02), 3-14
- 50-pin to 25-pin, D-sub (BC12J), 3-14
- 50-pin to 25-pin, D-sub (BC12L), 3-14
- 50-pin to 34-pin, D-connector  
(BC19F-02), 3-14
- 50-pin to 34-pin, D-sub (BC12G), 3-14
- 50-pin to 36-pin equipment (BN24K), 3-14
- 50-pin to 37-pin, D-connector  
(BC19B-02), 3-14
- 50-pin to 37-pin, D-sub (BC12H), 3-14
- 50-pin to 37-pin, D-sub (BC19E-02), 3-14
- 50-pin to 37-pin, D-sub (BC12K), 3-14
- 50-pin to eight 6-pin MMP equipment  
(BN24L), 3-14
- 50-pin to eight 8-pin MP equipment  
(BN26R), 3-13
- 8-pin MJ to IBM connector with built-in  
balun (BN26T), 3-15



9-pin, D-sub to 25-pin AT modem  
(BC29P), 3-14

9-pin, D-sub to eight 9-pin, D-sub AT null  
modem (BN29Q), 3-14

Cables — equipment room

6-pin MMP to 8-pin MP (BN24J), 3-15

8-pin MP to 8-pin MP  
(TIA/EIA Category 5) (BN25G), 3-11

fiber optic (BN25U), 3-12

fiber optic (BN25V), 3-12

Cables — office

6-pin MMP to 6-pin MMP terminal  
interconnection (BC16E), 3-12

6-pin MMP to 8-pin MP cable assembly  
(BC16U), 3-12

6-pin MMP to 8-pin office — crossover  
(BN24H), 3-12

8-pin MP to 8-pin MP office for TP-PMD  
interface screened  
(TIA/EIA Category 5) (BN26S), 3-21

8-pin MP to 8-pin MP screened  
(TIA/EIA Category 5) (BN26M), 3-21

high-performance data grade ScTP stranded  
(H8240-B), 3-21

IEEE 802.3 office transceiver  
(BNE4C/D series), 3-13

IEEE 802.3 office transceiver  
(BNE4G series), 3-13

UTP high-performance data grade stranded  
(H8240-A), 3-12

Category 3

UTP, 4-pair, standard data grade cable  
(H8245-A/H8246-A), 3-16

Category 5. See TIA/EIA Category 5

CCIA, standard for telecommunications  
building wiring, 2-2

Cisco, DECbrouter support, 4-47

clearVISN, 4-14

Combination remote wallmounted enclosure  
for fiber-optic cable for DERMS, 3-29

Communication Servers, DECserver 900TM,  
application/configuration, 4-35

## D

DE210-AA, D-3

DE212-AA, D-3

DE422-SA, D-3

DEC FDDIcontroller/EISA UTP,  
application/configuration, 4-58

DECwanrouter 90, application/configuration,  
4-50

DECbridge 90FL, application/configuration,  
4-22

DECbrouter 90, application/configuration,  
4-48

DEChub 90

supported modules, 4-12

typical configurations

building token ring network, 4-18

campus network with fiber backbone, 4-17

DIGITAL MultiSwitch 900

802.5/Token Ring

application/configuration, 4-40

collapsed backbone network, use in, 2-19

DEChub Communication Servers products  
features comparison chart, 5-8

DEChub Ethernet products features  
comparison chart, 5-5

DEChub FDDI products features  
comparison chart, 5-7

DEChub Hub products features comparison  
chart, 5-4

DEChub Internetworking products features  
comparison chart, 5-9

DEChub Management products features  
comparison chart, 5-10

DEChub Token Ring products features  
comparison chart, 5-6



- hub structured networks, use in, 2-13
- power system overview, 5-2
- power system, guidelines for calculating, 5-2
- supported modules, 4-11
- DEChub 900, typical configurations, building
  - Token Ring network, 4-18
- DEChub backplane, application/configuration, 4-17
- DEChub ONE-MX, 4-14
- DEChub Platforms
  - DEChub 90, 4-12
  - DEChub ONE, 4-13
  - Hub Manager, 4-11
- DEChub platforms
  - DEChub ONE, 4-13
- DEChub products
  - DEChub backplane, application/configuration, 4-17
  - hub manager, 4-11
- DECMR-MA, 4-30
- DECrepeater 90C, application/configuration, 4-31
- DECserver 900TM, application/configuration, 4-35
- DECserver. See Communication Servers
- DEHUB-BA, 4-12
- DEHUX-CA, D-2
- DEHUX-DA, D-2
- DEHUX-FA, 3-34, 3-35, 3-37
- DEHUX-GA, D-2
- DERMS, 3-2
- DERMS-AA, 3-34, 3-35, 3-37, D-2
- DERMS-BA, 3-34, 3-35, 3-37, 3-42
- DERMS-CA, 3-34, 3-37, 3-39, D-2
- DERMS-DA, 3-34, 3-35, 3-37
- DERMS-EA, 3-34, 3-37, 3-39, D-2
- DERMS-FA, 3-34, 3-35, 3-37, D-2
- DETMR-AA, D-3
- DETPR-AA, D-3
- DETPR-AB, D-3
- DETPR-BA, D-3
- DETPR-BB, D-3
- DEWAR-MA, 4-50
- DEWB1-MA, 4-48
- DEWGF-MA, 4-22
- DIGITAL MultiSwitch 900, 4-10
  - distributed backbone network, use in, 2-17
  - work group network, use in, 2-18
  - zone distribution network, use in, 2-14
- Discontinued Active Products, D-3
- Discontinued Passive OPEN DECconnect Products, D-2
- Discontinued products, D-1
  - BC16D-50, D-2
  - BC16K-06, D-2
  - BCC04-25, D-2
  - BCC08-50, D-2
  - BN26K-03, D-2
  - BN26K-04, D-2
  - BN26K-07, D-2
  - BN26K-0E, D-2
  - BN26L-03, D-2
  - BN26L-04, D-2
  - BN26L-07, D-2
  - DE210-AA, D-3
  - DE212-AA, D-3
  - DE422-SA, D-3
  - DEHUX-CA, D-2
  - DEHUX-DA, D-2
  - DEHUX-GA, D-2
  - DETMR-AA, D-3
  - DETPR-AA, D-3
  - DETPR-AB, D-3
  - DETPR-BA, D-3
  - DETPR-BB, D-3
  - DSRVD-MA, D-3



H3105-A, D-2

H3105-B, D-2

H3107-G, D-2

H3107-H, D-2

H3107-J, D-2

H3107-K, D-2

H3107-L, D-2

H3107-M, D-2

H3107-N, D-2

H3107-P, D-2

H3107-R, D-2

H3107-S, D-2

H3108-BA, D-2

H3108-CA, D-2

H3108-DA, D-2

H3108-FA, D-2

H3108-JA, D-2

H3117-NA, D-2

H3117-UA, D-2

H3131-C, D-2

H8853-AA, D-2

H9646-EA, D-2

Double-Height Cover for Hub

(DERMS-DA), 3-35

DSRVD-MA, D-3

DSRVZ-MA, 4-34

Dual ring of trees. See FDDI Applications/  
Configurations, dual ring of trees

## E

E0-H3111-DD, 3-8

E0-H3111-DG, 3-8

E0-H3111-DI, 3-8

E0-H3111-DK, 3-8

E0-H3111-DO, 3-8

E0-H3111-DW, 3-8

E0-H3111-E1, 3-8

E0-H3111-E2, 3-8

E0-H3111-E3, 3-8

E0-H3111-E4, 3-8

E0-H3111-E8, 3-8

E0-H3111-ED, 3-8

E0-H3111-EF, 3-8

E0-H3111-EK, 3-8

E0-H3111-FD, 3-8

E0-H3111-FF, 3-8

E0-H3111-FI, 3-8

E0-H3111-FK, 3-8

E0-H3111-FW, 3-8

E0-H3111-GI, 3-8

E0-H3111-GW, 3-8

E0-H3111-HI, 3-8

E0-H3111-HW, 3-8

E0-H3111-II, 3-8

E0-H3111-IW, 3-8

E0-H3111-NA, 3-8

E0-H3111-NB, 3-8

E0-H3111-NC, 3-8

E0-H3111-ND, 3-8

E0-H3111-NF, 3-8

E0-H3111-NG, 3-8

E0-H3111-NJ, 3-8

E0-H3111-NK, 3-8

E0-H3111-NN, 3-8

E0-H3111-NO, 3-8

E0-H3111-RF, 3-8

E0-H3111-RI, 3-8

E0-H3111-RW, 3-8

E0-H3111-SA, 3-8

E0-H3111-SB, 3-8

E0-H3111-SC, 3-8

E0-H3111-SD, 3-8

E0-H3111-SF, 3-8

E0-H3111-SG, 3-8

E0-H3111-SI, 3-8

E0-H3111-SJ, 3-8

E0-H3111-SK, 3-8

E0-H3111-SN, 3-8

E0-H3111-SO, 3-8



E0-H3111-SW, 3-8  
 EB-K2411-42/CDB, E-2  
 EC-H0631-42/CDB, E-2  
 EC-H1580-42/CDB, E-2  
 EC-I1382-69/CDB, E-2  
 EIA-423 Configuration Rules, C-3  
 EK-DECBR-OM/CDB, E-2  
 EK-DECSY-DC/CDB, E-2  
 EK-DECSY-EG/CDB, E-2  
 EK-DECSY-FI/CDB, E-2  
 EK-DECSY-FP/CDB, E-2  
 EK-DECSY-MI/CDB, E-2  
 EK-DECSY-TG/CDB, E-2  
 EK-DECSY-WI/CDB, E-2  
 EK-DECXM-AA/CDB, E-2  
 EK-DEFAR-OM/CDB, E-2  
 EK-DEFLM-IC/CDB, E-2  
 EK-DEFMR-OM/CDB, E-2  
 EK-DEHUA-IN/CDB, E-2  
 EK-DEHUB-OM/CDB, E-2  
 EK-DENMA-UI/CDB, E-2  
 EK-DETMM-IN/CDB, E-2  
 EK-DETPM-AA/CDB, E-2  
 EK-DEWGB-OM/CDB, E-2  
 EK-DEWGF-OM/CDB, E-2  
 EK-DH2MS-OM/CDB, E-3  
 EK-DRT90-OM/CDB, E-2  
 EK-DSRVE-OM/CDB, E-2  
 EK-DSRVG-OM/CDB, E-2  
 EK-DSRVZ-IN/CDB, E-2  
 EK-DTMAU-IN/CDB, E-2  
 EK-DTROR-IN/CDB, E-2  
 EK-DTROS-IN/CDB, E-3  
 EK-HUBMA-IN/CDB, E-3

## F

FDDI Applications/Configurations  
   DEC FDDI controller/EISA UTP, 4-58  
   definition, 4-58  
   dual ring of trees, 4-57  
   recommended topologies, 4-57  
   TP-PMD UTP, 4-58  
   work group configuration, 4-57  
 FDDI Configuration Rules  
   connection rules, C-7  
   network constraints, C-7  
 Fiber Distribution Units  
   High Density, 3-28  
   Low Density, 3-28  
 Fiber Splice Tray (H3108-TF), 3-40  
 Fiber-Optic Coupler Panels, 3-28

## H

H3105-A, D-2  
 H3105-B, D-2  
 H3106-A  
   pinout, A-7  
 H3107-GA, 3-27, 3-28  
 H3107-GB, 3-27  
 H3107-GC, 3-28, 3-29, 3-30, D-2  
 H3107-JA, 3-28, 3-29, D-2  
 H3107-JB, 3-29  
 H3107-JC, 3-29  
 H3107-JD, 3-29  
 H3107-JE, 3-29  
 H3107-JF, 3-29  
 H3107-KA, 3-28, 3-29, 3-30  
 H3107-L, D-2  
 H3107-M, D-2  
   pinout, A-2, A-3  
 H3107-N, D-2  
 H3107-P, D-2  
 H3107-R, D-2  
 H3107-S, D-2



H3108-AA, 3-37, 3-38, 3-41	H3109-BB, 3-2, 3-40
H3108-BA, D-2	H3109-BC, 3-2, 3-40
H3108-BB, 3-2, 3-40, D-2	H3109-BD, 3-5, 3-40
H3108-BC, 3-2, 3-40	H3109-BH, 3-5, 3-40
H3108-BD, 3-5, 3-40	H3109-BJ, 3-5, 3-40
H3108-BE, 3-38, 3-40	H3111-C, 3-6
H3108-BF, 3-38, 3-40	H3112-A, 3-7
H3108-BH, 3-5, 3-40	H3112-B, 3-7
H3108-BJ, 3-5, 3-40	H3112-D, 3-7
H3108-BK, 3-5	H3112-E, 2-11, 3-7, 4-28, 4-44
H3108-CA, D-2	H3112-F, 2-11, 3-7
H3108-CR, 3-37, 3-38, 3-40	H3112-G, 2-11, 3-7
H3108-CS, 3-37, 3-41	H3112-GV, 3-7
H3108-CT, 3-37, 3-41	H3112-H, 2-11
H3108-CW, 3-37, 3-38, 3-41	H3112-HV, 3-7, 3-21
H3108-DA, D-2	H3112-IV, 3-7
H3108-EA, 3-37, 3-38, 3-41	H3112-JV, 3-7, 3-21
H3108-FA, D-2	H3113-A, 3-7
H3108-GA, D-2	H3114-AA, 3-31
H3108-HA, D-2	H3114-AB, 3-31
H3108-IA, 3-37, 3-39, 3-40	H3114-FA, D-2
H3108-JA, D-2	H3114-FC, D-2
H3108-KA, 3-3	H3114-FD, 3-45
H3108-KD, 3-3	H3114-FE, 3-7, 3-22
H3108-KE, 3-3	H3114-FF, 3-7, 3-22
H3108-KF, 3-3	H3114-FG, D-2
H3108-PA, 3-2, 3-40, 4-22, 4-44, 4-48, 4-58	H3114-FH, D-2
H3108-PB, 3-2, 3-40	H3114-FI, 3-7, 3-22
H3108-RA, 3-36, 3-37, 3-40	H3114-FK, 3-27, D-2
H3108-RB, 3-36, 3-37, 3-40	H3114-FL, 3-27, D-2
H3108-TA, 3-3, 3-37, 3-38, 3-40	H3114-FN, 3-27
H3108-TB, 3-3, 3-37, 3-38, 3-40	H3114-FO, 3-27
H3108-TC, 3-37, 3-39, 3-40	H3114-FS, 3-27, D-2
H3108-TF, 3-37, 3-40	H3114-GA, 3-29, D-2
H3108-TG, 3-37, 3-41	H3114-GB, 3-29
H3108-TH, 3-37, 3-40	H3114-GC, 3-29
H3108-UB, D-2	H3114-GD, 3-29
H3109-AC, 3-3, 3-5, 3-41	H3114-GE, 3-29
H3109-AF, 3-41	H3114-GF, 3-29



H3114-GG, 3-29  
 H3115-AA, 3-31  
 H3117-HA, 3-3  
 H3117-LA, 3-3, 4-34, 4-44, 4-58, D-2  
 H3117-LB, 3-3, 3-21, D-2  
 H3117-LC, 3-3  
 H3117-LD, 3-3, 3-21  
 H3117-LE, 3-3, 3-21  
 H3117-LF, 3-3, 3-21  
 H3117-M  
     pinout, A-2, A-3  
 H3117-MA, 3-3, D-2  
 H3117-NA, D-2  
 H3117-NB, 3-3, 3-21  
 H3117-NC, 3-3, D-2  
 H3117-PA, 3-3, 3-31, D-2  
 H3117-SA, 3-3, 3-22, D-2  
 H3117-SC, 3-3, 3-22  
 H3117-SD, 3-3, 3-22  
 H3117-UA, D-2  
 H3117-UB, 3-3, 3-5  
 H3118-FA, 3-27, D-2  
 H3118-FB, 3-27, D-2  
 H3118-FC, 3-27  
 H3118-FD, 3-27  
 H3118-FE, 3-27  
 H3131-A, D-2  
 H3131-CA, 3-28, 3-29, 3-30, D-2  
 H3207-AB, 3-17  
 H3208-AA, 3-17  
 H3208-AB, 3-17  
 H3208-AC, 3-17  
 H3208-BB, 3-17  
 H3208-BC, 3-17  
 H3208-KA, 3-17  
 H3208-KB, 3-17  
 H3208-KC, 3-17  
 H3208-KD, 3-17  
 H3208-KE, 3-18

H3208-KF, 3-18  
 H3208-KG, 3-18  
 H3208-KH, 3-18  
 H3208-KI, 3-18  
 H3217-AB, 3-17  
 H3217-AC, 3-17  
 H3217-AD, 3-17  
 H3217-AE, 3-17  
 H3217-AF, 3-17  
 H3217-AG, 3-17  
 H4056, 3-33  
 H8100-A, 3-47  
 H8100-B, 3-47  
 H8100-C, 3-46  
 H8100-D, 3-46  
 H8100-E, 3-47  
 H8100-F, 3-46  
 H8100-G, 3-46  
 H8102-AD, 3-45  
 H8102-AE, 3-45  
 H8102-AJ, 3-45  
 H8102-AK, 3-45  
 H8102-AL, 3-45  
 H8102-AM, 3-45  
 H8102-AN, 3-45  
 H8220-00, 3-19  
 H8222-00, 3-33  
 H8223-00, 3-33  
 H8224-00, 3-33  
 H8225-00, 3-33  
 H8226-00, 3-19  
 H8226-AA, 3-19  
 H8226-AB, 3-19  
 H8240-B, 3-21  
 H8240-B\*, 3-21  
 H8241, 3-46  
 H8243-A, 3-32  
 H8244-A, 3-32  
 H8245-A, 3-16



H8245-AA, 1-3, 3-16  
 H8245-AC, 1-2, 3-16  
 H8245-BC, 1-2, 3-16  
 H8245-C, 1-2, 3-16, 4-28, 4-34, 4-44, 4-58  
 H8245-CA, 1-3, 3-21  
 H8246-A, 3-16  
 H8246-AA, 1-3, 3-16  
 H8246-AC, 1-2, 3-16  
 H8246-BC, 1-2, 3-16  
 H8246-C, 3-16, 3-21, 4-34, 4-44, 4-58  
 H8246-CA, 1-3, 3-21  
 H8247-AA, 1-3, 3-16  
 H8247-AC, 1-2, 3-16  
 H8247-CA, 1-3, 3-21  
 H8248-AA, 1-3, 3-16  
 H8248-AC, 1-2, 3-16  
 H8248-CA, 1-3, 3-21  
 H8250-AC, 3-25  
 H8250-DC, 3-25  
 H8250-FC, 3-25  
 H8250-KC, 3-25  
 H8251-AC, 3-25  
 H8251-FC, 3-25  
 H8251-KC, 3-25  
 H8251-LC, 3-25  
 H8252-FC, 3-25  
 H8853-AA, D-2  
 H9544-MS, 3-41  
 H9646-EA, D-2  
 High-Density Fiber Distribution Units, 3-28  
 Horizontal cabling design, 4-44  
 Hub structured networks. See Networks,  
     hub structured

## I

IEC/ISO, 11801 Standard, 2-4  
 IEEE 802.3 Transmission Model 1, C-2  
 IEEE 802.3 Transmission Model 2, C-2  
 IPX, EtherWORKS 3 cards, 4-36  
 ISO 8877 requirements, 2-11

## L

LAN Manager, EtherWORKS 3 cards, 4-36  
 LAN, definition, 4-19  
 Local area network. See LAN  
 Low-Density Fiber Distribution Unit, 3-28

## M

Mechanical Assemblies, 3-34  
 Modular faceplate (H3111-C). See  
     DECconnect, modular faceplate  
 Modular Mounting Options, 3-36  
 Modular Mounting System Accessories, 3-38  
 Modular Mounting System Starter Kit  
     (DERMS-AA) and Options, 3-35  
 Modular Mounting System with Cover  
     (DERMS-FA), 3-35  
 Modular office wallbox, 3-6, 3-22  
 MultiStack RackPack, 4-3  
 MultiStack, typical configurations, building  
     token ring network, 4-18

## N

NDIS, EtherWORKS 3 cards, 4-36  
 Network Configuration Rules  
     802.3/Ethernet  
         IEEE 802.3 transmission model 1, C-2  
         IEEE 802.3 transmission model 2, C-2  
         EIA-423, C-3  
     FDDI configuration rules  
         connection rules, C-7  
         network constraints, C-7  
     Token Ring guidelines  
         cable connector specifications, C-6  
         multiple hubs, C-4  
         multiple MAUs, C-5  
         multiple wiring closets, C-5



## Network Interface Cards

- EtherWORKS 3 Turbo 802.3/Ethernet 10Base2 card, 4-36
- EtherWORKS 3 Turbo 802.3/Ethernet 10BaseT card, 4-36
- EtherWORKS 3 Turbo EISA NIC (AUI, BNC, TP) card, 4-37
- EtherWORKS 3 Turbo PCI 10 Network Interface card, 4-37
- EtherWORKS 3 Turbo TP 802.3/Ethernet 10Base2 card, 4-36
- Fast EtherWORKS PCI 10/100 Adapter, 4-37

## Networks, hub structured

- basic considerations, 2-12
- collapsed backbone, 2-19
- distributed backbone, 2-17
- work group, 2-18
- zone distribution, 2-15

Novell NetWare, EtherWORKS 3 cards, 4-36

## O

ODI, EtherWORKS 3 cards, 4-36

## OPEN DECconnect

- architecture, 2-2
- DEChub 90 integration, 4-3
- DEChub 900 integration, 4-3
- definition, 2-4
- evolution, 2-4
- key features, 2-7
- media options, 4-3
- MultiStack RackPack, 4-3
- summary, 2-7
- system topology, 2-4
- TIA/EIA compliant, 2-3

## Outlets and connectors

- DECconnect, modular faceplate (H3111-C), 3-6
- H3111-C, 3-6
- H3111-GA/GB/GC, 3-6

Modular office wallbox  
(H3111-GA/GB/GC), 3-6

Snap-in data connector for screened twisted-pair (H3112-HV/H3112-JV), 3-21

## P

Patch Panel Wallmount Bracket  
(H3108-IA), 3-39

PATHWORKS, EtherWORKS 3 cards, 4-36

## Pinout tables

- 36-pin to 50-pin equipment cable, A-7
- 50-pin to 36-pin equipment cable, A-5
- 6-pin MMP to 50-in equipment cable, A-6
- 8-pin MJ to 50-pin patch panel, A-2
- 8-pin to 36-pin equipment table, A-7
- 9-pin, D-sub to 25-pin, D-sub modem, A-8
- 9-pin, D-sub to 9-pin, D-sub PC, A-8

## Power Supplies

- DEChub 900 MultiSwitch, power needs, guidelines for calculating, 5-2
- DEChub 900 MultiSwitch, use with, 5-2

## R

Rack Blanking Plates, 3-38

Rackmount Cable Management Kit, 3-38

## Reference documents

- DIGITAL, E-2
- other sources, E-3

Remote Wallmounted Enclosure for

Fiber-Optic Cable (H3131-CA), 3-29

RETMA angular mounting bracket for  
DERMS, 3-40

RETMA Mounting Bracket (angled)  
(H3108-RB), 3-36

RETMA Rack Mounting Bracket  
(H3108-RA), 3-36



Ring-in ring-out

802.5 Token Ring MAUs, 4-42

MAUs, 4-42

Routers, applications/configurations, 4-47

## S

SCO UNIX, EtherWORKS 3 cards, 4-36

Security Lock (DERMS-EA), 3-39

Single cover for hub, 3-35

Single Cover for Hub (DEHUX-FA), 3-35

Single Modular Mounting System Extender Kit (DERMS-BA), 3-35

Snap-in data connector for screened twisted-pair (H3112-HV/H3112-JV), 3-21

Structured cabling

advantages of, 2-8

components of, 2-8

vs. unstructured cabling, 2-8

## T

TIA, standard for building wiring, 2-2

TIA/EIA Category 3

110 IDC terminal blocks and components, prewired 50-Pin CHAMP to 50-Pair 110 IDC, 3-17

TIA/EIA Category 5

110 IDC terminal blocks and components

100 pair (no legs), 3-17

100 pair with mounting legs, 3-17

300 pair with mounting legs, 3-17

50 pair (no legs), 3-17

50 pair with, 4-pair connector kit, 3-17

50 pair with mounting legs, 3-17

connector block, 3-pair (kit of 100), 3-17

connector block, 4-pair (kit of 100), 3-17

connector block, 5-pair (kit of 100), 3-17

8-pin MP to 8-pin MP equipment cable

(BN25G), 3-11

8-pin MP to 8-pin MP office cable for

TP-PMD interface screened

(TIA/EIA Category 5) (BN26S), 3-21

8-pin MP to 8-pin MP screened equipment/office cable (TIA/EIA Category 5) (BN26M), 3-21

development, 2-4

high-performance data grade ScTP stranded cable (H8240-B), 3-21

list of products, 1-2

patch panels and accessories, snap-in 8-pin screened MJ to 110 punchdown patch panel insert kit, 3-20

UTP high-performance data grade cable (H8240-A), 3-12

UTP high-performance data grade cable (H8245-C/H8246-C), 3-16, 3-21

TIA/EIA-568A Commercial Building Wiring

Architecture Standard

distance limitations, 2-2

wiring system parameters, 2-2

wiring types, 2-2

Token Ring Configuration Guidelines, C-4

cable connector specifications, C-6

multiple hubs, C-4

multiple MAUs, C-5

multiple wiring closets, C-5

## U

Universal Equipment Shelf (H3108-TC), 3-39

Unstructured cabling vs. structured cabling, 2-8



## W

- Wall Partition Bracket (DERMS-CA), 3-39
- Wallbox. See Modular office wallbox
- Wallmount Cable Management Bracket, 3-38
- Windows NT, EtherWORKS 3 cards, 4-36
- Work group model. See Networks, hub structured
- Work Surface Tray (H3108-TA, Sliding) (H3108-TB, Hanging), 3-38
- Work surface tray for DERMS, 3-37
- Work surface tray for rack mounting for DERMS, 3-37
- Workgroup for Windows, EtherWORKS 3 cards, 4-36







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